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COMPUTER currents®

Volume 7 Number 1 MONTHLY January 1992

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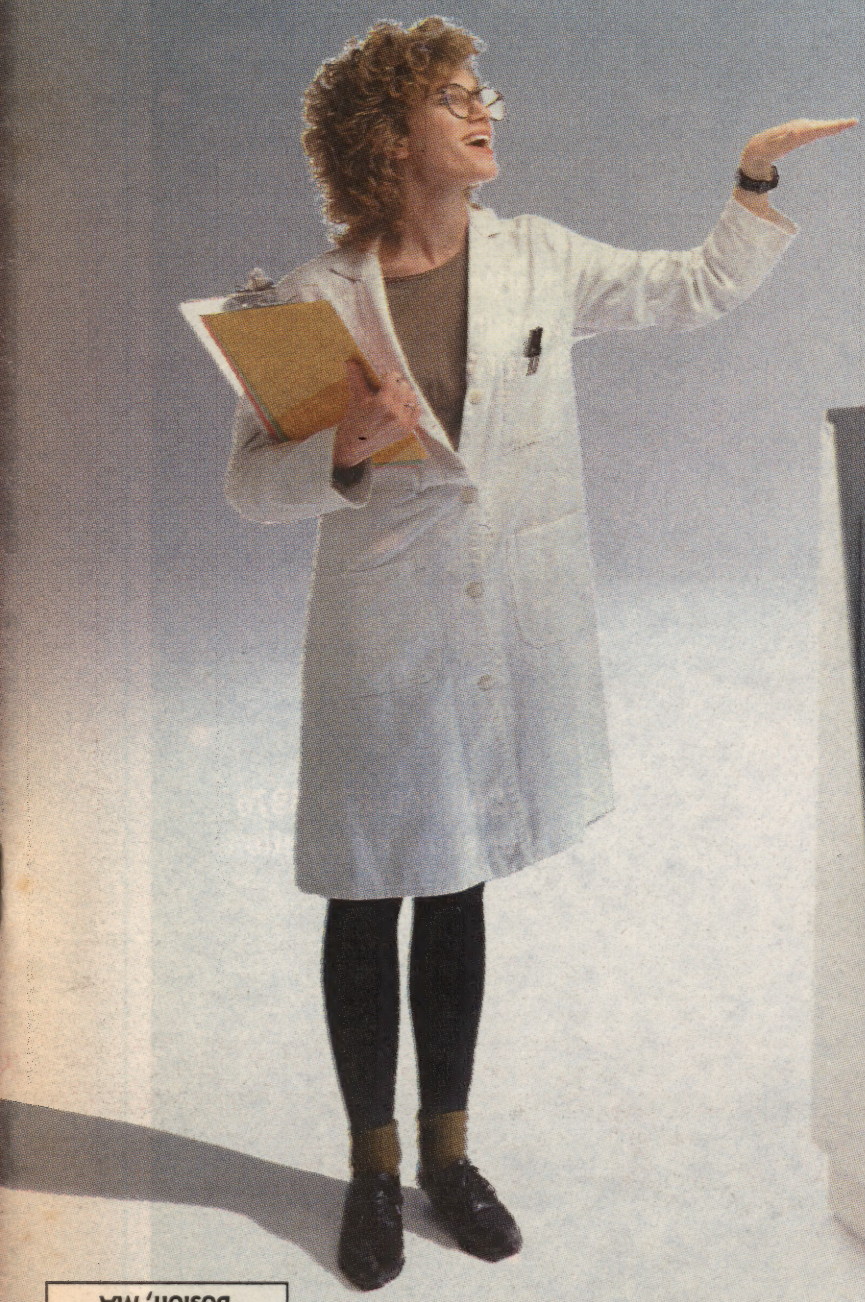
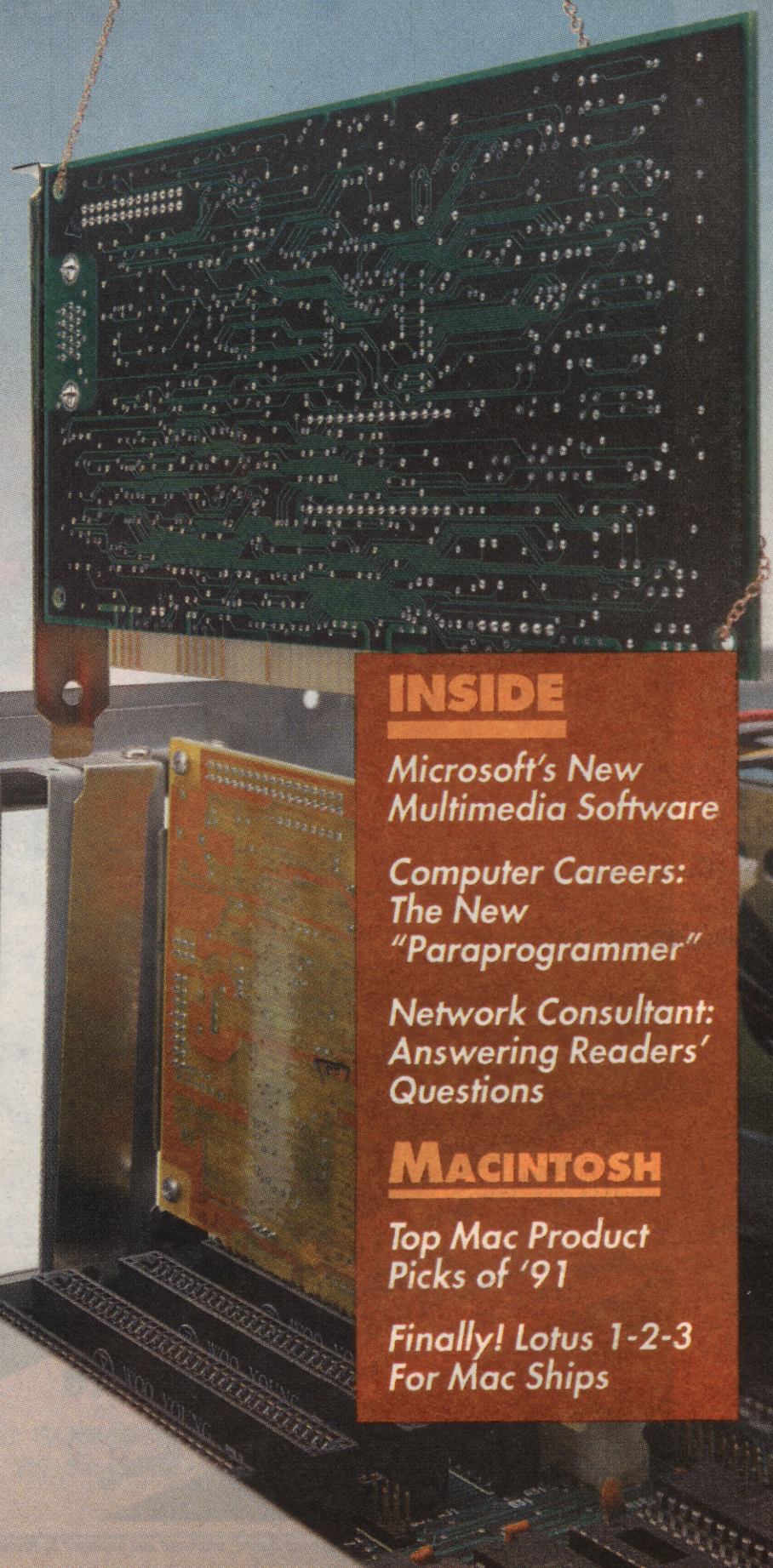
PC Upgrades

How to Improve PC Performance





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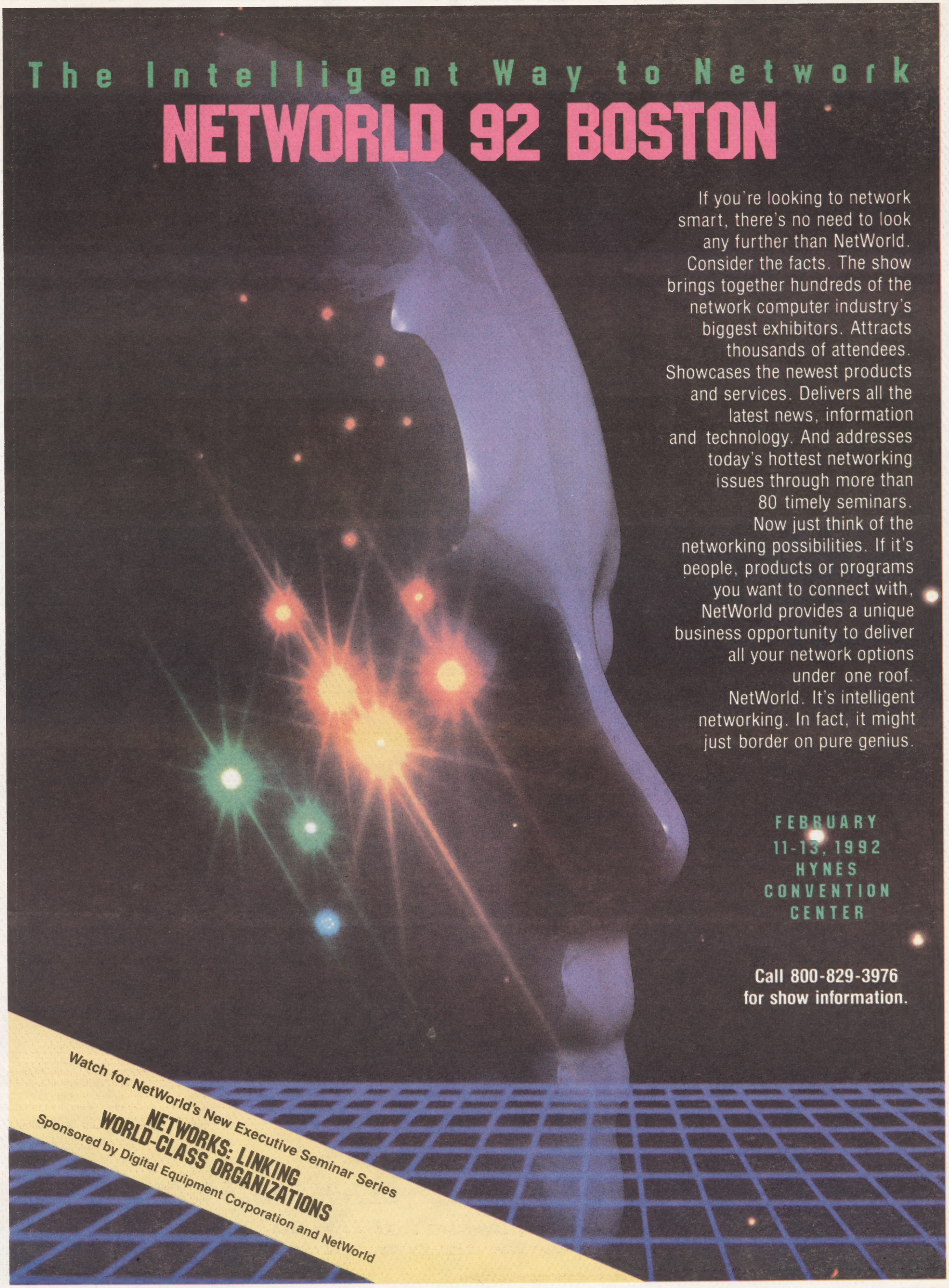
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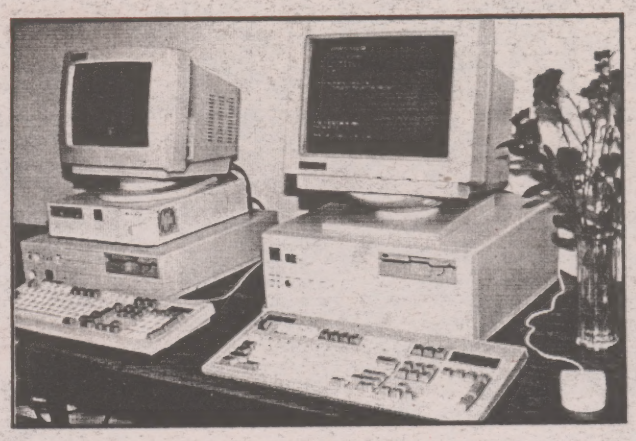

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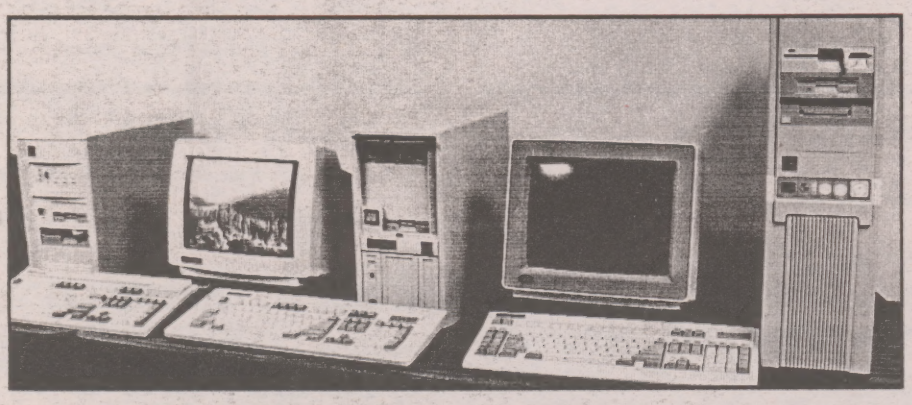

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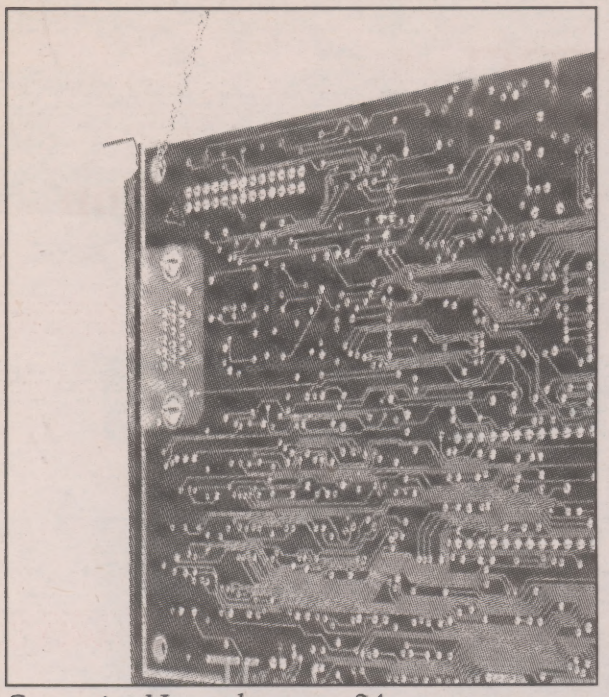

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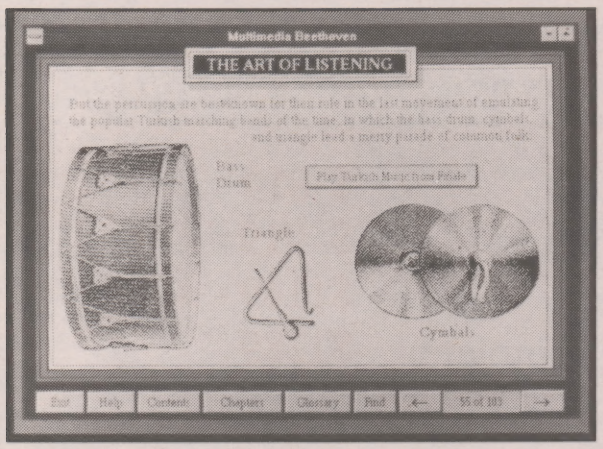

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COMPUTER Currents

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JANUARY 1992

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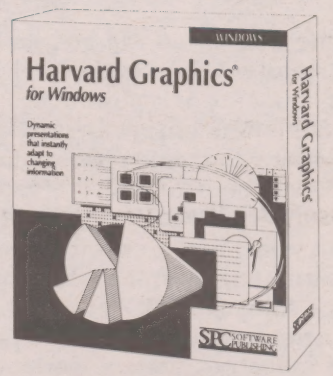

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EYE OF THE NEEDLE

Once-Simple Upgrade Path Is Now a Superhighway of Choices

Upgrading your computer has never been as simple, or as complex!

At a basic level, the decision to install a new monitor, hard disk, graphics card and the like is relatively easy. A wide range of quality off-the-shelf products is available and installation can be literally a "snap," or a precise insertion of component parts. But as the range and sophistication of personal computer applications has increased in the past few years, so too have the hardware choices, from high-capacity CD-ROM drives and upgradable CPUs to read/write optical drives, as well as accelerator, sound and video cards. This issue's cover story includes tips and resources to help you with your upgrade choices. PC owners should also take note of Rick Altman's column on SCSI hard drives, particularly if you find yourself running out of expansion slots on your PC.

We recently polled readers of our San Francisco edition. The results revealed that *Computer Currents*' readers are at the forefront of pushing their systems to the max through hardware upgrades. Another good way to expand the power and storage of your PC is through software. Sixty percent of our respondents said they had already found software solutions such as memory caching and compression to be effective. Such solutions can be a good first step before one makes the decision to invest in more expensive hardware solutions. If you've had success (or failure!) with a particular upgrade strategy drop us a line and we'll let other readers know about it.

Thanks All Around

The start of the New Year is as good a time as any to say that I really value the opportunity I get every issue to speak my mind on computer issues in this space. Even more valuable is your feedback — keep those letters, phone calls and faxes coming.

In the year ahead Marguerite Zientara will continue her resourceful coverage of the local computer scene employing her unique mix of reporting, feature writing and interview skills. As long as I'm passing out kudos, I should also take this opportunity to thank a few of the people you don't hear or read much about. Chris Oakes and Heather Howarth, the two key members of the Editorial Department, have done a terrific job this year. I'm also extremely happy with the way our crew of contributing columnists has grown this year. The addition of Rick Altman, Nick Anis, Tim Bajarin and Tony Bové has been a tremendous boost to our product coverage and analysis of industry trends important to computer buyers and users.

Finally, this past year I've spent a lot more time with our Art Director, Kris Warrenburg, and Photographer Brad Ream, develping our cover concepts. Their cleverness and creativity continues to amaze me, and I'm sure they've got more than a few surprises left for the year ahead.

On behalf of all our fabulous staff, thanks for your continued support, and let's all have a great '92.

David Needle

LETTERS

Doing Fine With DOS 3.3

Editor:

With regards to MS-DOS 5.0, what's all the shouting about? On my crummy XT, running under PC-DOS 3.3, I have 610K available for applications, with a little help from Quarterdeck's QRAM 2.0. Oh, and that's after the 90-some K used for device drivers and memory resident programs. Undelete? I've got that, both with Norton Utilities and Directory Magic. All file specs with the /w directory switch? I've got that with SDIR, and have had it for years. A new, improved editor? Just what I and the rest of the world really need — another text editor.

Oh, I'm sure that 5.0 has a lot of merit. But I have to wonder what the world would be like if Digital Research's DR-DOS and Quarterdeck's DesqView got a tenth of the publicity that Microsoft products get.

By the way, I like the fresh newsstand boxes. But aren't you worried about a "look and feel" lawsuit from the Chronicle?

Chuck Larrieu
Sonoma, Calif.

A "Unitechy" Store

Editor:

I have depended on Unitech for several years, using their Cambridge and Natick stores. When they were bought by a larger company, I was nervous for their fate.

Unitech's former employees have started their own company, Computer Connections, Route 1, Lambert's Rainbow Square, Westwood, MA 02090. I got in touch with them through the old Natick Unitech phone number. Their new number is 617/320-3600, and I'm glad they're back. I visited the store and spoke with Carol Cappadona, Manager. She told me a little about the takeover a year ago by another company and the subsequent damage done to a previously successful venture due to bad management. Her story has a welcome ending (especially in Massachusetts) with the establishment of a seasoned group of technicians running their business the way they know it works.

I know it felt great to see all those "Unitechy" computer parts in the new store. As Carol Cappadona said with a big smile, "Déjà vu!" I wish them the best of luck, and hope *Computer Currents* will mention something to help old and new customers find them at their new location.

Sincerely looking forward to more profitable times,

Janet DeVeau
Newton, Mass.

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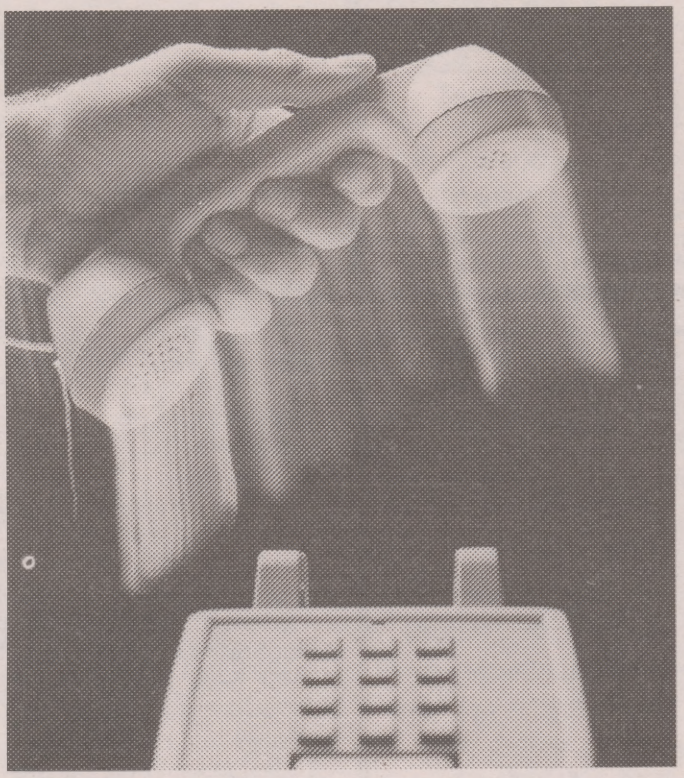

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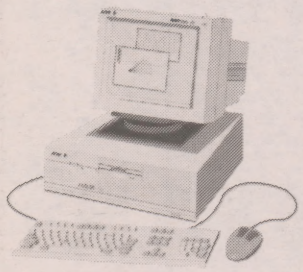

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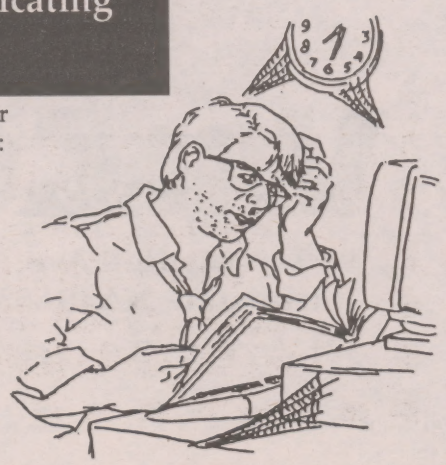

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By Marguerite Zientara

Great American Software Enters a New Phase

MECA Software's expected acquisition of Great American Software "looks like a good fit," says Great American's co-founder and president, Roger Melanson. At press time, the deal was expected to be finalized by the end of 1991.

In November MECA Software, Inc. (Fairfield, Conn.), best known as the publisher of the popular Andrew Tobias' Managing Your Money, signed a letter of intent to acquire Great American Software (Nashua, N.H.) for $5.8 million in cash, notes and common stock. Great American publishes One-Write Plus, a highly-rated accounting program for small businesses.

"I had been looking to recapitalize the company for about nine months," Melanson explained, "and had talked with a lot of different options — venture capitalists, other strategic partners and potential merger candidates.

"I liked MECA, I liked the people, I liked where they were positioned in financial management products for individuals. A lot of their customers are budding entrepreneurs who will someday grow out of some of their products and hopefully into our products. They have Managing Your Money and TaxCut, and it gets us a little bit into the tax business — I've always wanted to do that."

Impact on Employees

The deal would open doors for MECA as well. "The proposed acquisition would fulfill a long-standing strategic objective of MECA's to become a major software publisher in the small business finance market," said Daniel Schley, MECA's president and CEO. "Great American Software has successfully targeted the market we seek to address, and would afford MECA an excellent opportunity to pursue our strategic vision."

Whether "Great American Software" will survive as a company name or whether it will become a brand name is not yet clear, Melanson said. "But I know that we will keep the Great American name, as we will One-Write Plus, which is also becoming a very well-known brand in the channel and with accountants."

What MECA Gets

Acquisitions and mergers tend to make employees a little nervous about job security, but Melanson does not foresee a negative impact on his people. "When two growing companies get together and have some synergy, there might be an opportunity for even more pronounced growth," he says. "I think everybody here at Great American is very optimistic about perhaps expanding some careers. I would say there's opportunity for virtually anybody."

Acknowledging that some duplicate positions in the two companies may leave a few employees out in the cold, Melanson said the principals haven't yet addressed that issue. "We've talked mostly about expansion, about hiring certain key people, now that our combined size would allow us to do so," he noted.

Melanson intends to remain with MECA/Great American, although at press time he was not sure what his title would be.

Co-Founder Paul Johnson May Move On

Great American's co-founder, Paul Johnson, the chief designer of One-Write Plus, may choose to leave MECA/Great American, however. "It was one of Paul's goals to perhaps branch out and do something a little different over time," Melanson explained, "and this will give him some opportunity to do it, either with MECA or on his own. He'll get a little bit more liquid as a result of the transaction."

What about those stories one hears about acquired CEOs getting the rug pulled out from under them? "You know, I talk to people who ask me, 'Aren't you concerned?'" Melanson admits. "But I've never been concerned. I've worked for myself for 15 years. I've never had a management contract or anything like that. I've got a lot of confidence in myself, and I think I'm important enough for them to keep around."

Exactly how good a fit might this be? Says Melanson: "It looks good, it feels good, and we're beginning to work together even though the deal's not inked yet."

BCS Loses President Tracy Licklider, Aims to Turn Tide of Falling Membership

As of Thanksgiving Day, it was official — Boston Computer Society (BCS) President Tracy Licklider had resigned and was no longer keeping office hours. After nearly two years at the helm of the 25,000-member BCS, Licklider stepped down to spend more time with

SEE PAGE 10

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FROM PAGE 8

his family.

"The principal reason was just time," Licklider explained. "Because just about everything is done by volunteers, that entails a lot of breakfast and dinner meetings. I had gotten to the point where I was spending four nights a week, several mornings, and half of Saturday on the BCS. I just felt like it was too much time away from home."

Licklider — who in the past has been a professional programmer and systems designer, as well as chief operating officer for Software Arts and a vice president at AI Corp. — also felt a lack of technical challenge in what was essentially an administrative position.

"What I'm missing is a deeper technical challenge," he said. "I'd like to go back and create some state-of-the-art software and deal with some of the fun technical issues that are coming about. It also was frustrating for me to be involved so superficially over the past two years with so many projects. I knew about them but I was not really involved in any of them."

Will Continue BCS Involvement

Licklider will remain on the BCS board of directors, so he can "concentrate on some projects but not give the same time commitment." For the time being, Licklider will do some consulting work, and he has no shortage of ideas for the future.

He expects to teach some classes for the BCS, hopes to do some "meaty" writing, may initiate kids' computer clubs in public schools, and will remain active with The Computer Museum's Discovery Center.

Licklider is especially interested in helping neophyte computer users who "don't know what they need to know." For them, he envisions holding BCS classes in shopping malls, since "that's where they are," he observes, "and no one is dealing with them very well."

Search Firm Scours Area for New President

Although Licklider informed the BCS of his decision to leave in July, by December the formal search for a new president was only a month old. "Practically speaking, we probably won't have a new president in place until April," estimated Mary McCann, BCS Executive Director and Editor of the *BCS Update* newsletter.

Conducting the presidential search is the Boston-based search firm of Isaacson, Miller, Inc., which "basically is talking to everyone under the sun who's associated with the BCS," McCann said.

"They [the search firm] came in and talked to the staff, and they're attending committee meetings, activist meetings and group director meetings, to get input from a variety of different constituencies," she said. "They want to see what sort of qualifications are considered the most important, and then I guess they'll come up with some miracle person."

The "miracle person" may well be a woman or a member of a minority group, since Isaacson, Miller has a good record of placing people from those categories. The BCS has had only two presidents in its 14-year history — founder Jonathan Rotenberg, and Licklider (since January 1990).

BCS Responds to Declining Membership

Founded in 1977 by Rotenberg, who was then still in high school, the BCS grew along with the PC industry. From the days when Rotenberg and a few classmates got together casually after school, the BCS has expanded to include members from all 50 states and 58 countries.

Dedicated to educating the public about computers, the non-profit organization today sponsors more than 50 user groups and special interest groups, publishes more than 40 newsletters, and offers many educational services and programs.

The BCS is still the world's largest computer user group, even though its membership has declined in recent years, from a high of almost 31,000 in 1988 to 25,000 today. Part of the decline, certainly, can be traced to the poor economic climate, particularly in New England. But the BCS has pinpointed another, more manageable, factor — its own apathy.

"In the past, members just came to us," McCann explains. "They'd call us up or send in applications, and that would be that." In past years, when someone called the BCS for information about joining, someone would handwrite the caller's name and address on an envelope and send out a brochure and a membership application. No record was kept of the caller's identity or interests. "We would never follow up, never do anything at all," McCann recalls.

For years that was enough, as long as the checks kept coming in. With membership dropping off, however, something more had to be done. Now, the BCS' staff includes marketing people who take such calls, do a little selling, a lot of explaining, and at the same time build up a nice database for active membership solicitation. McCann says the plan is working, and membership is growing once again.

The BCS is one of the best resources around for personal computer users or would-be users, and still a good deal at $39 for a basic one-year membership. For more information, call 617/252-0600, or write Boston Computer Society, One Kendall Square, Cambridge, MA 02139.

Name Change Alert

Computer Doctor Corp. has changed its name to MicroAccess Computer Center, Inc. Founded in 1988, the firm is a one-stop source of PC and network solutions. MicroAccess is at 203 Middlesex Turnpike, Burlington, MA 01803. Telephone 617/272-5670.

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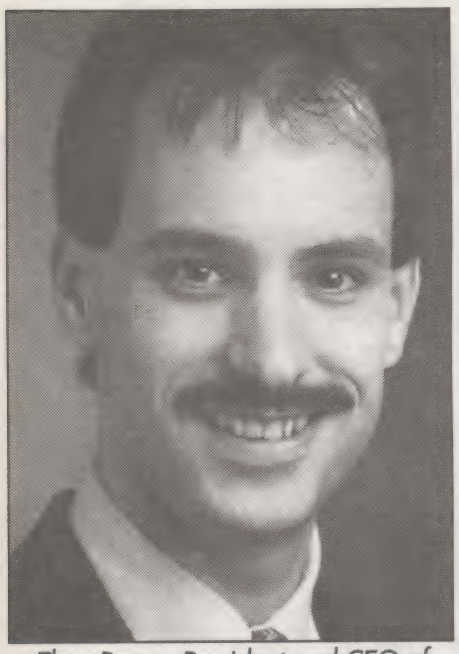
BOSTON COMPUTER NEWS

By Marguerite Zientara

Corporate Microsystems Promotes Theo M. Pozzy To President & CEO



Theo Pozzy, President and CEO of Corporate Microsystems

Theo M. Pozzy, one of the founders of Corporate Microsystems, Inc. (CMI; Lebanon, N.H.), has been named President and Chief Executive Officer. He takes the helm from Richard L. Green, co-founder, who remains as founder and secretary of the corporation.

"Dick Green steered us through incredible growth," says Pozzy, formerly vice president of research and development, and the principal architect of the company's MLINK product line. Under Green's direction, CMI grew from four people to a company of more than 20 employees.

"Now that we're on the brink of major new technology advancements and announcements," Pozzy said, "Dick will focus on our strategic business relationships." CMI recently announced the MLINK Advanced Communications Manager software targeting corporate MIS requirements for automated and unattended data exchange between headquarters and thousands of remote business locations.

Corporate Microsystems provides customized, cross-platform and automated data transport solutions for large corporations with enterprise-wide communications requirements. Its customers include Pizza Hut, Inc., Bank of Louisville, Kentucky Fried Chicken Corp., and Pacific State Fisheries (Portland, Ore.).

CMI is headquartered at Mt. Support Road, P.O. Box 2059, Lebanon, NH 03766. Telephone 603/448-5193.

Diagramming Software Now Runs Under Windows 3.0

Meta Software Corp. (Cambridge, Mass.) has upgraded its MetaDesign flowcharting and diagramming software to take advantage of Microsoft Windows 3.0.

MetaDesign was created as a hierarchical thinking tool for systems designers, engineers and business users to build both simple and complex flowcharts, presentations and diagrams.

MetaDesign Version 3.0 is faster and reportedly features new palettes to provide industry-standard icons for flowcharts, logic diagrams, network diagrams, and data flow diagrams. Multi-level undo lets users trace their steps back through the last 10 operations performed.

Users can zoom in and out of their diagrams in 1% increments between 10% and 400% to ensure the maximum use of their workspace, regardless of screen size. Users can display pages in cascade or tile format — whichever is more effective in their drawing process.

MetaDesign 3.0 costs $350 under Windows, and $250 for the Macintosh version. Upgrades cost $69.95. Meta Software is at 150 CambridgePark Drive, Cambridge, MA 02140. Telephone 617/576-6920.

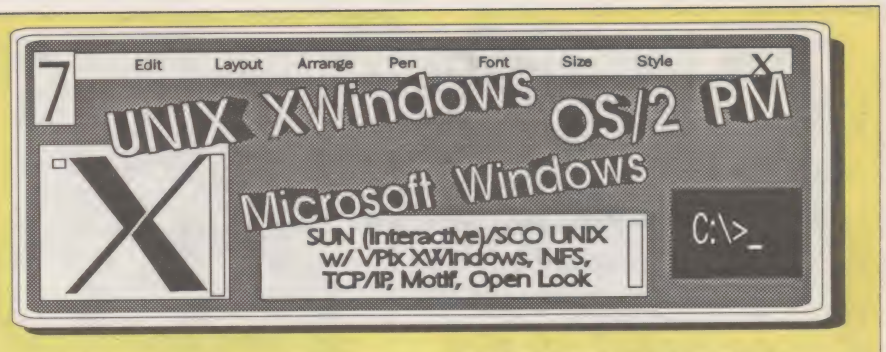
$99 Communications Software Server For Windows

Microcom, Inc. (Norwood, Mass.) has unveiled MicroCourier, a $99 communications package that allows Windows users to connect to other PCs, bulletin boards and information services. MicroCourier reportedly includes support for more than a dozen popular file-transfer protocols and many terminal emulations.

The package features a script language that automates repetitive tasks and log-ons, a "learn mode" macro recorder that automatically writes scripts, a customizable directory of commonly dialed connections, on-screen help, and data compression for quick file transfer.

Microcom is at 500 River Ridge Drive, Norwood, MA 02062. Telephone 617/551-1000.

SEE NEXT PAGE



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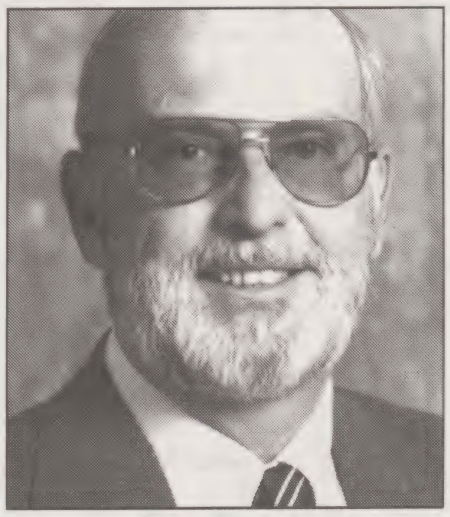
Bitstream Names James W. Sole President & CEO



James W. Sole, President and CEO of Bitstream, Inc.

Bitstream, Inc. (Cambridge, Mass.) has appointed James W. Sole as President and Chief Executive Officer of Bitstream, and has elected him to the company's board of directors. Sole replaces Rob Friedman, who, after almost 10 years with Bitstream, has assumed the presidency of Electronics for Imaging, Inc. (San Bruno, Calif.).

Sole comes to Bitstream from Agfa Corp., where he was vice president and general manager of the CAPS Division, which he reorganized into a standalone business unit. Previously, Sole was president and COO (chief operating officer) of Xyvision, Inc.

The majority of Sole's career was spent at Xerox Corp., following a few years at IBM. Sole's last position at Xerox was vice president of the Workstation Business Unit. He holds a B.S. degree from Rensselaer Polytechnic Institute and an MBA from the Wharton School of Business.

Bitstream, an industry leader in digital typographic technology, is located at 215 First Street, Cambridge, MA 02142. Telephone 617/497-6222.

SuperOffice Corp. Establishes North American Headquarters In Lexington, Mass.

SuperOffice Corp., an outgrowth of Office Line A.S., a leading computer retailer in Norway, has opened its North American headquarters in Lexington, Mass.

The company develops and markets business information and contact management software for PC/Windows and the Macintosh. In use in more than 1,000 companies worldwide, SuperOffice software is a highly integrated, multi-user office management database product.

SuperOffice software reportedly combines four familiar office management tools — client contact directory, daily schedule planner with calendar, follow-up tracking, and correspondence templates for mail or fax — with a shared database. This approach is said to place critical and timely information at each person's fingertips and to give company-wide visibility to customer-related activities.

For single or multiple users, SuperOffice supports virtually all word processors, including MacWrite II, Microsoft Word and WordPerfect, as well as Microsoft Excel and Lotus 1-2-3 spreadsheets. Mac and Windows versions are priced as follows: single-user, $395; 1-5 users, $1,695; 1-10 users, $2,695; nodes for more than 10 users, $195 per user. SuperOffice has a 30-day money-back guarantee.

SuperOffice Corp.'s new address is One Cranberry Hill, Lexington, MA 02173. Telephone 617/674-1101.

Clearpoint Wins Motorola Bridge Award

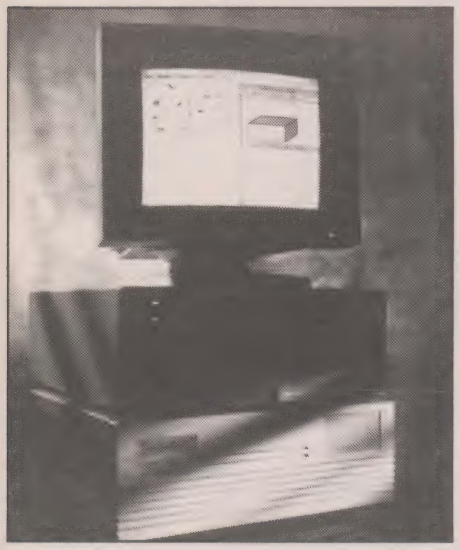
Clearpoint Research Corp. (Hopkinton, Mass.), a manufacturer of add-in memory, data storage subsystems, and internetworking products, won the Bridge Award, a Motorola Supplier Excellence Award for 1990.

Clearpoint supplies Motorola with components that are used in the design and manufacture of Motorola/Codex products. Clearpoint was selected by Motorola/Codex out of 375 suppliers and was one of only 14 suppliers throughout all divisions of Motorola worldwide to receive the Bridge Award.

"It is a great honor to have been chosen as one of Motorola/Codex's Bridge Award winners," said Clearpoint President and CEO Vincent Bono. "Clearpoint employees earned this award for their efforts to ship products according to the customers' specifications with zero defects."

Clearpoint Research Corp. is at 35 Parkwood Drive, Hopkinton, MA 01748. Telephone 508/435-2000.

ILAN 5.0 Supports LAN Manager/NetView & SNMP



CrossComm Corp. (Marlboro, Mass.) has unveiled version 5.0 of its ILAN Internetwork Management System (IMS) for managing enterprise-wide internetworks in an IBM environment. IMS 5.0 is said to be the first to integrate IBM LAN Network Manager, NetView, and SNMP (Simple Network Management Protocol) network management in a single system.

ILAN IMS 5.0 reportedly is significant for managers of IBM corporate networks because it gives them advanced internetwork management for IBM LANs and WANs (Token Ring and SNA networks) as well as non-IBM devices (TCP/IP) across a multivendor environment.

Until now, IBM customers managed IBM networked equipment through NetView, Token Ring LANs with a LAN Manager station, and TCP/IP LANs through an SNMP-based platform. This required multiple levels of equipment, technical staff and expertise.

"While SNMP is the de facto standard for internetwork management in non-IBM environments, there is no SNMP equivalent in the IBM world," said Tad Witkowicz, president of CrossComm. "IBM customers have had to deal with a hodgepodge of network management systems. CrossComm's strategy with IMS is to provide comprehensive network management for IBM customers. No other vendor, including IBM, has addressed this issue to date."

IMS includes features for configuring, administering and improving performance of IBM corporate networks. For example, IMS' new graphical user interface (GUI), based on Microsoft Windows 3.0 and Hewlett-Packard's Open View, provides a graphical view of the internetwork and point-and-click operation.

Also available is a remote version of IMS (RIMS) that allows telephone access to IMS stations from anywhere in the world, via any PC or laptop with a modem. ILAN IMS 5.0 will be available in 45 days; prices range from $3,000 to $4,000.

CrossComm is at 140-C Locke Drive, Marlboro, MA 01752. Telephone 508/481-4060.

Graphics Add-In For WordPerfect 5.1

Desmond International, Inc. (Boston, Mass.) has introduced Perfect Presentations Version 2.0, an add-in that reportedly adds presentation graphics capabilities to WordPerfect 5.1.

"Perfect Presentations was developed to allow WordPerfect users to create presentation graphics without leaving WordPerfect," says David Tarrant, president of Desmond International. "It is designed for word processing users who want a fully integrated graphics capability within their word processor."

Perfect Presentations users can access a spreadsheet-like data entry form to create pie, bar, line, area, and scatter graphs, or they can import Lotus 1-2-3 worksheet files directly to create their charts. Also included is an organization chart program with automatic placement of boxes and connecting lines based on a simple hierarchy specified by the user.

Perfect Presentations costs $95 and has a 30-day money-back guarantee. It requires WordPerfect 5.1, 640K of RAM, and a hard disk. A laser printer, either HP LaserJet or PostScript-compatible, is recommended.

Desmond International is at 99 High Street, Suite 3001, Boston, MA 02110. Telephone 617/338-9650.

VideoLogic Cuts Multimedia Kit Prices 20 Percent

VideoLogic, Inc. (Cambridge, Mass.) has dropped prices more than 20 percent on Mediator — its desktop computer-to-video conversion kit — and eight new "plug and play" multimedia kits. The kits contain a DVA-4000 full-motion digital video adapter, the platform-independent MIC System software, cables, productivity tools, and documentation.

"We've dropped our prices and bundled our products to make working with multimedia easy and affordable," said Kirke S. Curtis, VideoLogic's general manager. "With our new 'plug and play' kits, everything you need comes in one box, at one price, with one part number. Customers will get much more for much less."

Now priced at $2,195 each are: Plug and Play Multimedia Kits for PC XT/AT (with MIC System I or II); and for PS/2 (also with MIC System I or II). Now priced at $2,395 each are: Plug and Play Multimedia Kits for Macintosh; Macintosh IIsi; PC XT/AT and SVGA (with MIC System I or II). Mediator costs $2,395.

VideoLogic is at 245 First Street, Cambridge, MA 02142. Telephone 617/494-0530.

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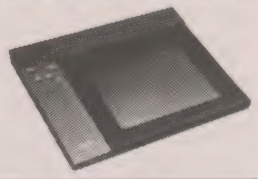

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Strategies for Managing End-User Computing

An Interview With Author Naomi Karten

By Marguerite Zientara

The idea that end users and corporate information centers should become more business-oriented is not a new one. But it is not always clear, when immersed in the daily grind of end-user computing or support services, exactly how to effect such a desirable change.

Naomi Karten, Randolph, Mass.-based consultant, seminar leader, and author of the book *Mind Your Business: Strategies for Managing End-User Computing*, has plenty of ideas on the subject. Karten divides the world of support services into two stages: stage 1, being demand-driven, and stage 2, the enviable business-driven environment.

In *Mind Your Business* (QED Information Sciences, Inc., Wellesley, Mass., 1991), Karten offers guidelines, case studies, strategies, and techniques for end-user computing solutions that help employees address their business' needs.

The book offers insight into how to get from stage 1 to stage 2, while specifying numerous ways you can learn about business in general and about your organization's business needs in particular. Whether you are an end user or a manager of end-user computing, *Mind Your Business* sheds some light on how to help your company become the efficient, enlightened place you know it can be.

Computer Currents talked with Karten recently about the ideal state of a business-driven corporate computing environment.

In your book, you've made it clear that getting from the demand-driven stage 1 to the business-driven stage 2 is a difficult transition. Can you estimate realistically what percentage of information centers (ICs) in corporate America are actually at stage 2?

Very, very, very few, but there are many that are in transition, which is very satisfying to me.

I often pose the question when I'm working with groups, especially when I have people from a lot of companies together, "How many of you feel you are pure stage 1?" A couple of people will raise their hands, very reluctantly, because they don't want to admit it. And usually they're not stage 1, they just think they are. They're actually moving along.

Then I ask, "How many of you view yourselves as totally and completely stage 2?" And there are no hands whatsoever. Occasionally there are one or two who feel they're there. But when I ask a few more questions, I don't think I agree with them.

Have you actually seen stage 2 in operation?

I've seen organizations that have dedicated staff to a consulting role, that really do try to divide the more demand-driven, product-oriented work from the in-depth business-focused kind of work. I haven't seen a lot of cases where they're really proactive — where they really get out there and work with users to take a look at some of the business things going on, and try to develop PC solutions. More often it still happens that the consulting type of group is there, but they take requests from users and they respond to those requests.

If a company is in the process of going from stage 1 to stage 2, I suppose there are benefits simply from being in the transition stage.

Definitely. Just thinking about what it means to move forward can be very, very positive. What I like to do most is get together with an entire information center or client services group and really work through some of the problems they're dealing with now and specify the directions they want to move in. I try to get them to define what they see as their stage 2.

Invariably out of this kind of an effort they get so many ideas that can help improve the quality of the demand-driven, training and support kinds of services that they begin to move in that direction, even if they might not have thought of it in those

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terms. So just the very process of sitting back and saying, "Where should we go and what is the problem now?" helps to improve the quality of the services.

In a stage 2 environment, how would it feel to end users, compared with stage 1? How would their corporate lives change?

I think they would begin to see many more opportunities. I think many of them know as much as they know about using PCs, but they don't know what they don't know. That's not an insult, it's just a reality — none of us knows what we don't know. But many of them look at PCs strictly in terms of pure automation tasks — such as taking the manual and putting it on the computer. They themselves don't perceive some of the opportunities that can be unearthed by really looking at business needs and translating them into potential computer solutions.

So I think it can open up whole new worlds, and new ways of looking at how to accomplish the things they must do anyway through computer solutions.

And from the point of view of the information center staff, how would it feel different being in stage 2?

Some of them would not like it at all. One of the impediments to moving forward is that many of the people who currently populate ICs and client services groups are people who thrive in a demand-driven environment. They are product-oriented people. They get great satisfaction out of that, and they don't want to become more business focused. That's fine, but it may suggest a need to change the nature of the staffing or complement it in some way, build new strengths.

For those who want to get into more of a consulting-oriented approach, it can be very satisfying to actually participate in a project that has some bottom line benefit, rather than just being ongoing, never-ending delivery of ad hoc demand-driven services. Stage 2 is project specific. It's doing something for a client area that has some tangible benefit that is known up front.

And for the IC as a whole, it can help to generate results which can more clearly be articulated to management. One of the problems ICs deal with now is that it's very hard to show what they have done that matters. It's not that they're not doing work that matters, but it's hard to translate it into business benefits.

So by virtue of moving at all in the direction of stage 2, they begin to do more and more that translates into terms that can be communicated to their own management and to corporate management about why what they do matters.

In the case of the technical person who likes it the old way, do you think they're in danger if everyone else seems to be moving in this business-driven direction?

In some companies they may be in danger, just as in some companies, information systems (IS) as a whole is in danger. I think there will always be a need for technical support, product support. It may not continue to be delivered through the IC, or continue to be delivered within an organization. It may mean going out to a vendor firm. So the nature of the work that is needed may mean that these people's roles will change.

I tend to think they're not really an endangered species, though, because if you look at what's happening with the technology now, it's getting ever more complicated, even as it's getting easier. Connectivity, local area networks — all these sorts of things mean there's still a very big role for the technically-oriented person.

What is the difference between "computer literacy" and "information literacy" — a topic you address in your book?

Computer literacy is happening, and that's easy. Information literacy is something that isn't really happening yet, and that's the next level up. That's really understanding the uses of data and the potential misuses of data — how to translate data into information so that it has value rather than just pumping out a lot of gibberish.

I often ask groups how many of them are focusing on issues of information literacy at all in their support services, and generally the answer is, practically no one.

We hear the apocryphal situation of five users from different departments showing up at a meeting, each with his own spreadsheet, but all the spreadsheets are generating different results. Very often it ties back to different definitions being used throughout an organization, and how a particular data element is used. Several people can each develop an application that is absolutely perfect, but they all generate different results because there is no common understanding of definitions.

A more trivial but more common example is a lot of the graphics that are being done. Most ICs have had the experience of someone showing up saying, "I need a graph." And they ask, "What do you need? Tell me what your problem is." The answer comes back: "I don't know. I need a graph." So we're moving into this realm where, if it's snazzy and it looks good, people say, "Let's make one of them." But they're not really communicating useful information.

Can you talk a little bit about the importance of promoting user self-sufficiency, and how to do that?

Promoting user self-sufficiency is generally one of the key objectives of most ICs. It is something always to shoot for, although it doesn't always happen, for a lot of reasons. But you can come at it from two angles — the

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benefits to the users and the benefits to the IC itself.

People in general will always go where they can get the answer quickest. And if there is a central support group to help them, and they're permitted to, they will call there for help. But the fact is that users now are turning to each other for support — to the person at the next desk, to their friends, to whoever is using a product that they're having problems with.

Part of promoting user self-sufficiency is harnessing the talents that users already have so they are best equipped to help each other, and to help themselves so they don't have to rely on any external source of support — whether it's the IC or an outside vendor.

The training and support role of the IC — the hotline or help desk — should be structured so that any training not only gives quick answers, but also teaches people how to solve the same problem themselves the next time around.

Ideally, there should be an educational component to every response. In reality you can't always do that, but at least it should be part of the philosophy of delivering support.

Is there anything a user can do to help a company get to stage 2?

I'd like to think that users can help get the ball rolling, and I would love to see groups of users in organizations say, "Hey, there is more we can be doing. Let's develop some momentum." I think there are issues of perceptions here and I think many ICs have the perception that training and support is all that is wanted of them, or all that users will tolerate from them.

There have been specific cases where the IC has wanted to move forward and users say, "No, just help us install PCs and select software and teach us how to use it." I think that happens partly because users don't always perceive the benefits of a more consultative in-depth approach.

Where the users are enlightened and do see that, I think they should become the proactive ones, and approach the IC, approach IS, and show how they can jointly benefit. And that is a key message that I've tried to promote through the book. In other words, it's not just either one doing *to* the other. Everyone can stand to benefit by taking a good hard look at what the business issues are and how the computer can help. I'd love to see users help to move this process along where it will serve their best interests.

Is there any parting word of advice that you'd like to offer?

Start small. Look for a single project that you can work on that would be of value in a single user area. Build the relationships, work on the project, fit it in among the other things. Have it generate benefit and then publicize and communicate the benefit to management. And don't be surprised if word of mouth marketing begins to move the organization forward, even without taking specific steps to do so. So my parting advice is, "Start somewhere, start anywhere."

* * *

Naomi Karten is president of Karten Associates, 40 Woodland Parkway, Randolph, MA 02368. She also writes and edits a monthly newsletter, *Managing End-User Computing*, published by Auerbach Publishers, Boston. For more information on Karten's book or newsletter, call her at 617/986-8148.

On January 16, Karten will be the featured speaker at the joint meeting of the Association for Women in Computing and the Pilgrim Chapter of DPMA (Data Processing Management Association). Her topic will be "Risks and Responsibilities in End-User Computing." The meeting will be held at the Best Western Factory Mutual Conference Center, Rt. 1 South, Norwood, Mass. Dinner, 6:30 p.m., speaker, 7:30. For reservations, call Bill Kelly at 508/359-5479.

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Marguerite Zientara is the author of ***The History of Computing****, copyright CW Communications, Inc., 1981, and* ***Women, Technology & Power****, Amacom Books, New York, 1987.*

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Interviewed by Marguerite Zientara

"There just aren't that many clone shops like us that have a dozen 16-inch, and larger, monitors in stock."

Store Name:	Excell Computer Wholesale
Location:	305A South Broadway, Salem, NH 03079
Telephone:	603/893-4747; Outside N.H.: 800/955-8545
Hours:	Mon.-Fri., 10-7; Sat., 10-6
Type of Sales:	Storefront
Year Started:	1986
Salespeople:	3
Products:	Excell store brand systems, ranging from 286 through 486/33 machines. Peripherals from Nanao, Panasonic, Hewlett-Packard, ViewSonic, Sony, NEC, Orchid. All brands of DOS and Windows. Novell authorized.
Specialties:	Networking, high-end systems, graphics workstations, CAD workstations.
Consulting:	Yes
Service/Support:	Minimum 1-year warranty on parts, 5-year warranty on labor. Tech-support hotline. Massachusetts service center (at Westborough Computer).

Excell Computer Wholesale's Sales Manager Luc Levensohn (left) and Controller Alan Kuo.

Our interview was with Sales Manager Luc Levensohn.

What would you say differentiates Excell from the competition?

I think the main thing that differentiates us is that if there's a problem, we will work through it 100 percent, and we take care of problems quickly. That's not the case at all the clone shops.

The combination of taking care of problems very promptly and having a reasonable amount of high-end inventory is probably the difference. There just aren't that many clone shops that have a dozen 16-inch, and larger, monitors in stock.

What is selling the best right now?

The 386/33s and 486/33s.

Why?

Generally, if you want 4MB of RAM, if you want a 100MB hard drive, if you want a non-interlaced monitor, you're almost always going to buy a 386/33 or 486.

Is that what most people are looking for?

It depends. People are either looking for an entry-level system for home use, say for word processing, or they have a technical background and want a fast machine.

What is your biggest challenge as a retailer?

Convincing people that we are different. For some people who walk in, if you're knowledgeable and attentive and your prices are reasonable, that's all they need.

But then other people are only interested in getting the best price, and they think all stores are alike. So you've got to emphasize your assets.

Will you negotiate with someone on price?

I try not to. I might throw something in, but I'll try not to do anything on the price. Excell sells on service.

Is the poor economy posing a particular challenge to you?

Computers are such a commodity right now that people who need them, need them, and there's no two ways about it. The poor economy will just force them to shop for a better value, which is good for us.

Right now we have the longest backlog we've had all year, but if things are good for us right now, they could be better. There's a reasonable number of people shopping for machines for their homes or for whatever reason, but certainly there could be more.

Do you think things will improve in 1992?

I think things will continue to be more competitive on the lowest price level.

What do you foresee in the next few years?

I think prices will continue to drop and retailers will have to be creative to retain their margins. We will continue to sell on service.

Does Excell have any plans for expansion at all?

We've talked about opening another store. And it may happen during 1992, but we'll be conservative about how it's done.

Will you be expanding product lines at all?

Definitely. We just started selling Orchid motherboards, and we're authorized for Panasonic, Nanao monitors, Orchid video cards and motherboards, and ViewSonic. We'll be looking to do more high-end CAD and graphics workstations, as well as Novell networks.

Is there anything else you'd like people to know about Excell Computer Wholesale?

Our philosophy is basic: If your prices are competitive, if you take care of your customers, and if you're consistent, then no matter what happens, things will always be okay. And that's generally been the case. If you take care of people, regardless of the economy, as long as there are computer stores open, then you'll be one of them.

By Tim Bajarin

New Category of Computer Specialist

Opportunity For "Paraprogrammers"

I am often asked the following question: How can I get into the computer industry these days? If the question is asked by someone in his teens, I tell him to go to college and get a degree in computer science. But the folks that ask me this question the most often are either people who have already gone to college and majored in another field, or they have a mixed educational bag and want a change.

More recently, with the job market being very tough, I have been asked this question from people in a variety of fields where they have hit some type of a career dead-end. When asked this question in the latter part of the 1980s, I had encouraged them to take night courses in computer science subjects to become more familiar with the computer. I also have recommended that people take category-specific software courses, such as word processing, spreadsheets, etc. and perhaps try to enter the business market as software specialists.

But as we head into the 1990s, there is a new category of computer specialist that is about to emerge, people I call paraprogrammers. This new type of programmer could create some interesting new job opportunities for a lot of people who do not have specific computer backgrounds, but are willing to learn some new skills in order to get into the world of computers and business.

Other business fields have specialists like paralegals and paramedics, and now the computer industry is about to get its own: paraprogrammers. The role of a paraprogrammer is linked to a significant new software programming concept called object-oriented programming (OOP). With this approach to programming, much of the programming code is actually pre-written by the programming language vendor, and the person working with this code draws on the objects, or object libraries, to write the bulk of the specific program.

Two leaders in object-oriented programming languages today are Borland, with its ObjectVision software, and Microsoft, with its Visual Basic program. In the works is object-based software coming from Apple and IBM, via their Taligent venture, and Microsoft will deliver an object-based layer in its New Technology Operating System that it plans to have out later next year. Trained programmers already use object-based code like C++, and on the way for them are object-oriented versions of Fortran, Prolog and even Cobol. These OOP versions of popular programming languages are designed to help a trained programmer speed up his program development, while ObjectVision and Visual Basic are designed for non-programmers to create software programs.

We actually have a type of paraprogrammer today. These individuals normally reside within an MIS department and are given the task of customizing a database or spreadsheet using a scripting or database language like those found in dBase and Paradox. Many times they create macros for repetitive tasks. Some of these are actually professionally trained programmers, while many of them have just

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learned a particular database language and are trained to create this custom layer of the program. But this code is text-based, not object-based.

The main goal of these programmers is to customize an off-the-shelf database or spreadsheet for use in their own MIS programs. While these tasks will continue to be provided by this special type of programmer for awhile, object-based programming offers even a novice the ability to create customized programs for the office to use. Object-based code also promises that we will have custom software even at the individual level. In fact, that is the real promise of object-oriented programming: customization.

It means that in the future, a company will not be forced to use only off-the-shelf software to meet its productivity needs. And, in the case of Taligent and Microsoft, they plan to actually deliver the object-oriented programming layer in the operating system. This will allow a company to take these object-based libraries and actually create serious custom programs that an entire department can use.

Trained programmers will continue to play a very important role, especially in the creation of code that will be used for the commercial market. They will also become an important part of the management of these paraprogrammers, in the same way doctors or lawyers oversee the work of their paraprofessionals.

While the types of strict codes and regulations that govern the medical and legal community will not be applied to paraprogrammers, MIS departments will use the trained programmer for logic analysis and final program verification.

Object-based programming allows anyone with a solid understanding of logic and design to use the base object libraries to create the custom program that makes up the heart of an application. It dramatically cuts down the development cycle, and uses this new type of paraprofessional to help the professional design and develop a more customized solution for almost any sized business.

I also believe there will be a whole new type of business opportunity emerging from this demand for customization, similar to the one we had in the 1970s. Back then, trained programmers got together and set up shop and sold their services to large and medium-sized businesses to customize mini and mainframe software. Eventually, object-oriented-programming shops will offer their services to even small businesses who want a custom program but don't want to learn how to do it themselves.

Although off-the-shelf software will still play a role in client/server programs, the ability to have custom solutions even in a small business, via object-oriented programming, will expand the world of software design and creation to a whole new level.

For those interested in becoming more familiar with this new programming opportunity, there are a couple of books you should pick up to help you get a better handle on this.

The first one is from Chris Crawford, entitled *How to Program: The Skill That Will Sharpen Your Thinking*, published by Storm King Press and retailing for $5.95. You can find it at bookstores that have large computer sections, or you can order it from Storm King Press, P.O. Box 2089, Friday Harbor, WA 98250 ($7.20 including postage and handling). While Crawford's position is that nobody should enter programming for the money, he argues that programming is good for you.

Programming is like writing, woodworking or photography, he contends. Anybody can do it. Doing it well, like an expert, takes a lot of work, experience and talent. But anybody who can write a comprehensible paragraph can write a workable program. All it takes is a computer and some time. I agree with Crawford that the big bucks are not here like they were in the early eighties. Writing a hit program now is harder then winning the lottery. But object-based technology will allow a whole new group of non-professionally trained people to create some exciting programs in the future. And it will create many new jobs for those who are willing to buckle down and learn an object-based programming tool, such as Visual Basic.

Crawford goes on to say that there are three good reasons to learn to program. First, he says, there is the recreational or creative aspect of it. Second, you to learn to communicate, because you can't be ambiguous with a computer. Third, it helps you to master clear thinking by learning a new language. In the book, Crawford illustrates the fundamental concepts in Basic, the most widely available computer language.

This becomes a great primer for a book entitled *Visual Basic* by Steve Holzner of the Peter Norton Group. Published by Brady Books, it includes a 3 1/2-inch disk of 100 ready-to-run programs you can experiment with and sells for $39.95.

This book goes into the product itself and lays out how to use it effectively. The 100 programs on the disk are meant to help you learn to use this programming tool immediately.

This area of object-based programming will open up some new doors for people who want to become more involved with the world of computers in business. And the paraprogrammer will eventually become an important part of the programming staff in business, where customizing software will be the name of the game in the 1990s.

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Tim Bajarin is Executive Vice President of Creative Strategies Research International, a market research and consulting firm. Correspondence may be sent to him at CSRI, 4655 Old Ironsides Drive Suite 490, Santa Clara, CA, 95054.

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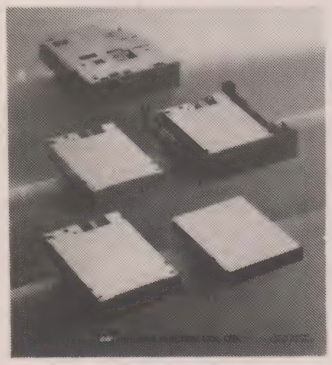

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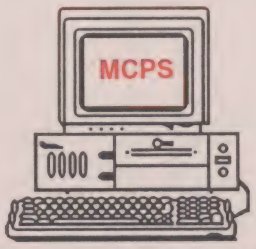

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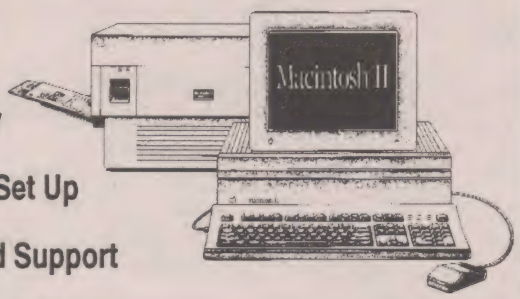

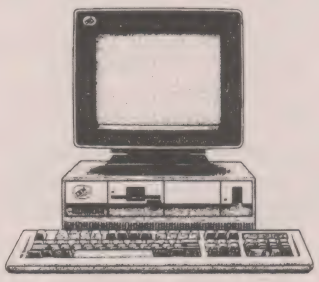

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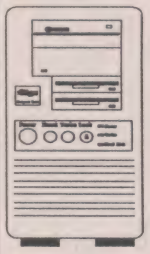

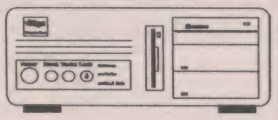

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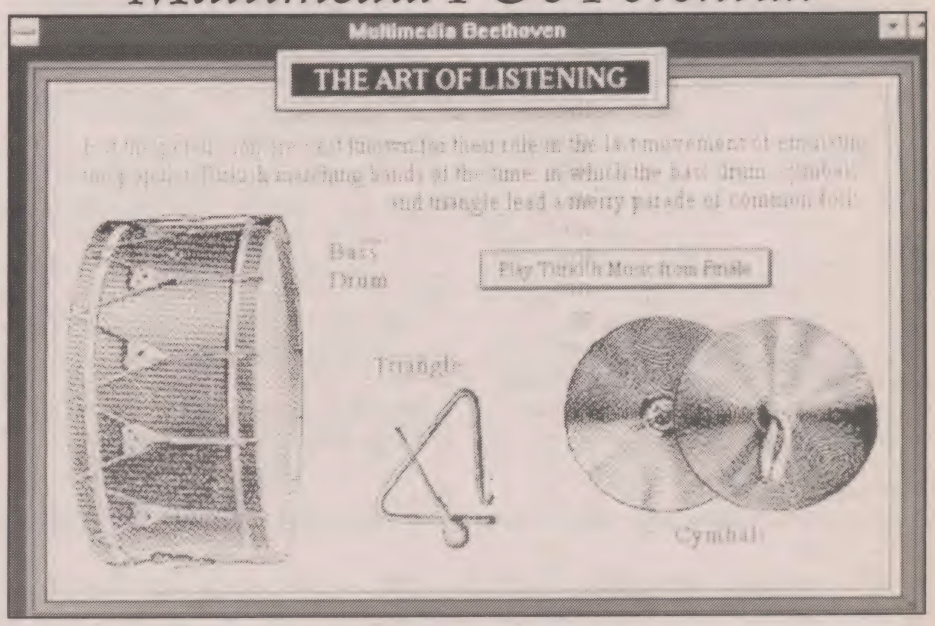
By Charles Bermant

Beethoven & Bookshelf

Demonstrations of Multimedia PC's Potential



Microsoft's Multimedia Beethoven, a $79 CD-ROM title, offers an overview of Beethoven and the Ninth Symphony, including a section on the art of music listening.

The multimedia personal computer, or MPC, was introduced with much fanfare and hoopla a few months back at New York's Museum of Natural History, but most of the world couldn't have cared less. With all the things happening in the world — the Thomas hearings, the Mideast peace talks and the Christmas shopping season — no one wants to know about yet another personal computing standard that's going to squander our already precious time and money.

So perhaps an even smaller group noticed — or cared — that the first few MPC applications are now available. If the early word is overwhelmingly positive for these apps — they truly go where no software has gone before — their presence calls for a mixed blessing. Bookshelf for Windows and Multimedia Beethoven — both, incidentally, from Microsoft — are cool products. But it's unclear how many people have the means or the motivation to support these packages. For instance, it costs about $1,000 to add the M to your PC; once there, the gains are not so apparent.

It is software that sells hardware. Lotus 1-2-3 drove the early PCs. On the other side of the fence, Beatles' compact disc reissues gave the new media a critical mass. The first MPC programs lack this kind of power, as there is nothing in either of these packages that makes you jump up and scream. Rather, these are great demos, rations of what this technology can and will do as soon as everyone is equipped.

Ironically, MPC actually does have the potential to change how people live, work and compute. It both expands the scope of available information and makes it more comprehensible. The key to knowledge is literally stored on a little round disc. Having all this information in easy reach will, ultimately, make people smarter.

The easy answer is for you to buy an MPC anyway. Yes, you. Why? Publishers won't offer the software range until the drives are in place. Users won't buy the drives without useful software. So if we want to move everything to the next level, we need to increase the user base. The easiest way

to break the chain is to add MPC and wait. Expensive? Sure. Worth it? As a long-term investment, undoubtedly. And we have at least two programs to keep us company while we're waiting.

Enter, Software

Bookshelf is a collection of reference works, meant to replace the desk staples on which so many depend: dictionary, thesaurus, almanac, encyclopedia, atlas and quote reference. Whether or not you rely upon these volumes today may have little bearing on how you might use Bookshelf. The issue is convenience: Consider how often you use the thesaurus within your word processor, and how that instance would decrease if the effort took more than a keystroke. Similarly, you can argue that word processors' thesauri have increased the overall literacy of the people using them.

Aside from speed, Bookshelf offers some advantages over its analog cousins. Each word in the dictionary is spoken aloud, should you have any trouble understanding pronunciation hieroglyphics. Scientific phenomenon is illustrated through animation. And several of the quotes have a sound bite to accompany the printed word. There is a standard interface and an integrated search module, so if you want to know everything about "mustard," punching in the keyword searches all the volumes.

When it comes to knowledge, Bookshelf is a dilettante's tool. You won't really learn in any depth from the material here; the encyclopedia is, after all, a "desk" encyclopedia. And while the text of Bartlett's Quotations is complete, the spoken quotes are limited to Robert Frost, Carl Sanburg, T.S. Eliot, E.E. Cummings, Dylan Thomas and John F. Kennedy.

The lack of depth notwithstanding, Bookshelf is still an excellent demo program. That is to say, it can be used for its intended purpose, with its shortcomings justified by the nascent nature of the media itself. It has considerable room for improvement, but is by no means useless. Microsoft plans to issue annual updates, with both informational and technological enhancements. (This version is titled Bookshelf 1991, despite its end-of-year release). For instance, as a satisfactory voice compression process is developed, the dictionary portion will require less room. On this edition, Microsoft had someone record every word individually and the recorded data took up nearly half of the disc.

Bookshelf is one disc that everyone who has an MPC will find necessary. By its nature, however, it is not the type of program that motivates the purchase of a CD-ROM and a sound board.

Roll Over, John Sculley

Multimedia Beethoven is Certs software: It's educational. It's entertainment. Geeky people have been telling us for years that learning can be fun, but this usually precedes the demonstration of something truly awful. But this disc is great. Unlike Bookshelf, which offers a short, convenient view of the language arts, Beethoven dissects a single topic and offers an in-depth view of a single piece of work — the notorious Ninth Symphony, one of history's best known pieces of music.

Multimedia Beethoven begins with a recording of the Ninth, which can be played in a standard audio drive (that is, if you skip the opening data track). It then turns the composition inside out; even those who "know" the Ninth will appreciate this dissection. The presentation divides into five parts: The Pocket Guide charts the four movements in outline form, with a mouse click sending you to and from its various segments. Beethoven's World is a 125-page historical look at the man and his music. The Art of Listening demonstrates musical concepts, with examples from the Ninth. A Close Reading walks through the entire symphony, with textual and graphical support. Finally, the Ninth Game quizzes you on both the historical and musical questions. A gleeful animated Ludwig pops a champagne cork when you get it right, a reminder that there are very few representations of Beethoven smiling (read Beethoven's World and find out why).

I'm not a classical music scholar. I'm familiar with the Ninth, but don't actually know a lot about Beethoven. So I represent what must be Multimedia Beethoven's target audience, computer users weaned on rock and roll.

With Beethoven and Bookshelf, Microsoft has demonstrated MPC's potential. While anything can happen in this wacky world of PC standards, these products indicate this platform now seems to be worth the investment. It will — again, I pull out the hyperbole stick — seriously increase computing power. With MPC, the average amount of available information increases. As a result, everyone is better informed. Even if most of the information is of a trivial nature, it is at least a step in the right direction.

MPC is worth getting. And buying into this new standard becomes an investment in the future.

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Charles Bermant is a freelance writer based in Gladstone, Oreg. He is the author of ***The Windows 3.0 Companion****, now available from Business One Irwin. He can be reached through MCI Mail as "cbermant."*

Product Info

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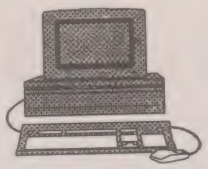

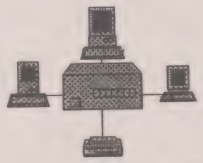

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NETWORK CONSULTANT

By Sam Adicoff

Answering Readers' Network Questions

The operation of a network — regardless of the number of nodes or the size of the company — produced the majority of questions I received from you over the past month. Until Novell invents a "magic wand" that corrects network problems with a wave of a hand, keep those questions coming.

Question: I manage a marketing department that shares a Novell network (running version 2.2) with our graphic design department. This has worked well so far, but I recently found out that the graphic design department plans to triple the number of Macs on the network by the end of 1992. It's my understanding that the AFP (AppleTalk Filing Protocol) can degrade network operations. If this is true, what can we do to prevent any performance degradation?

Answer: To prevent performance degradation, you should upgrade to NetWare 3.11 and use NetWare for Macintosh 3.0. Due to its design, NetWare 2.X with the Macintosh VAP (value-added process) is much less efficient, meaning you will see performance degradation in your server if it runs a large number of Macs. In the case of NetWare 2.X, you really shouldn't exceed ten Mac connections.

NetWare 3.11 should be able to handle up to 40 or more Macs without visible degradation.

NetWare 3.11, on the other hand, was designed as a modular operating system using NLMs (NetWare-loadable modules) and a Macintosh module exists that is tightly integrated into the operating system. Plus, the operating system was specifically designed for 32-bit computers — unlike NetWare 2.X — which makes it run faster. The upshot is: NetWare 3.11 should be able to handle up to 40 or more Macs without visible degradation.

Keep in mind, however, that the Mac NLM will take up an additional two to three megabytes of RAM in your server. After you implement the Mac NLM, you may not have enough memory left to cache the server drives. If you don't have sufficient memory, you'll need to add more RAM since the inability to cache the drives will result in severe performance degradation.

Question: I'm planning to upgrade my Novell network from version 2.15c to version 3.11. Any tips, tricks or techniques you can offer? How much downtime can I expect?

Answer: Before you do anything, take an inventory. First, is your server still adequate for the job? If not, now is the time to replace the server drive with a larger one; the upgrade will be faster and easier.

Second, identify any VAPs or Macs that you want to attach to the server. You must upgrade the VAP products to NLMs or in the case of the Macs, you must purchase NetWare for Mac 3.0. If you don't know what a VAP is, provide an inventory to your LAN installers so they can handle the necessary upgrades. Any tape backup or optical drives attached to the server are run by VAPs, as are many remote printing and power shutdown programs. Plus, if you have a Storage Dimensions disk subsystem or any SCSI drive, you are using a VADD (value-added disk driver) which will also need to be up-

graded before you proceed. And you'll need new LAN drivers for your network interface cards.

In addition, you will probably need more RAM in your server to meet the greater RAM requirements of 3.11. As mentioned in the answer to the previous question, caching your server disks is critical for smooth operations. You might also consider upgrading your server to a faster 386 or 486 machine. In fact, if you are planning to add workstations to the LAN at the time of the upgrade, use the existing server as one of the workstations, then add a new server. This way, you can have the new server up and running before any data is transfered.

To minimize downtime during the upgrade, start with meticulous planning and a contingency plan, just in case Murphy's Law comes into the picture.

As a precaution, plan to have two completely verified file-by-file (not image) backups made immediately before the upgrade begins. If anything goes wrong, you'll at least have your data preserved on tape. The transfer of programs, data, and bindery information takes place through a utility provided by Novell called Upgrade. However, Novell only supports a few tape backups under this utility and the odds are high that you may not have the proper tape backup. If you don't have a tape backup system supported by Novell, the two easiest ways to perform the file transfer are:

1) Attach a new server with a disk large enough to hold everything on your current disk, plus an additional six megabytes. Next, perform a complete server transfer using the upgrade utility. As you can imagine, installing a new server at the time of the upgrade greatly expedites the process.

2) Attach a workstation with enough disk space (in one volume) to hold the entire contents of your file server drive. Use Novell Upgrade to do a complete backup to this drive, then install the new version of NetWare on your file server and use Upgrade to restore from the "temporary" disk. If you don't have the necessary hardware to use either of these methods, you'll have to use some combination of Novell's Upgrade utility and your tape backup. Make sure your tape software version will restore properly to your NetWare 3.11 server, especially if you have Mac files.

Last, don't forget to run BINDFIX (a Novell-supplied utility) on your old server before you proceed; otherwise, you may experience serious difficulties transferring the bindery information during the upgrade.

If you follow this advice, you should count on one complete day of downtime. If you are using servers that have a disk capacity of more than 600 megabytes, more time may be required. The best strategy for minimizing downtime during and after the upgrade starts with meticulous planning and a contingency plan, just in case Murphy's Law comes into the picture.

Question: Are wireless networks reliable? My offices are located in an historic landmark so cable installation would involve some extra precautions and costs. If I go with a wireless network, what is the cost for equipment and installation?

Answer: Wireless networks are reliable if you get the right one. Also, just as with cabled networks, if you exceed the limitations of the network, you are bound to periodically encounter "mysterious" technical problems.

As far as reliable wireless LAN systems are concerned, one that comes to mind is the wireless Ethernet system from Motorola. Motorola employs the 18GHz radio band that the FCC recently opened up for use by computers. This frequency offers a clear, virtually interference-free spectrum and the bandwidth to handle higher data speeds expected from future systems.

The typical wireless LAN consists of a main module that is centrally located, as well as node modules attached to each workstation and shared printer (on the LAN). The transmission distances vary and are obviously affected by walls and other physical structures. In the case of the Motorola product, the area of coverage is 5,000 square feet. While line of sight between the main module and user modules is not required, walls and other obstructions will reduce the area of coverage.

If you plan to move your LAN frequently, you will quickly recoup the additional investment, because there will be no sunken costs as you move from building to building or floor to floor.

Finally, a wireless LAN can make sense when cabling becomes prohibitively expensive. This can occur when you need to place cable through concrete or steel walls, or if workstations will be located in an open office area with no walls or power poles close by. With a concrete floor, it can be very expensive to place cable drops in these areas.

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Sam Adicoff is president of PC Edge, a San Jose, Calif.-based company that specializes in computer networks.

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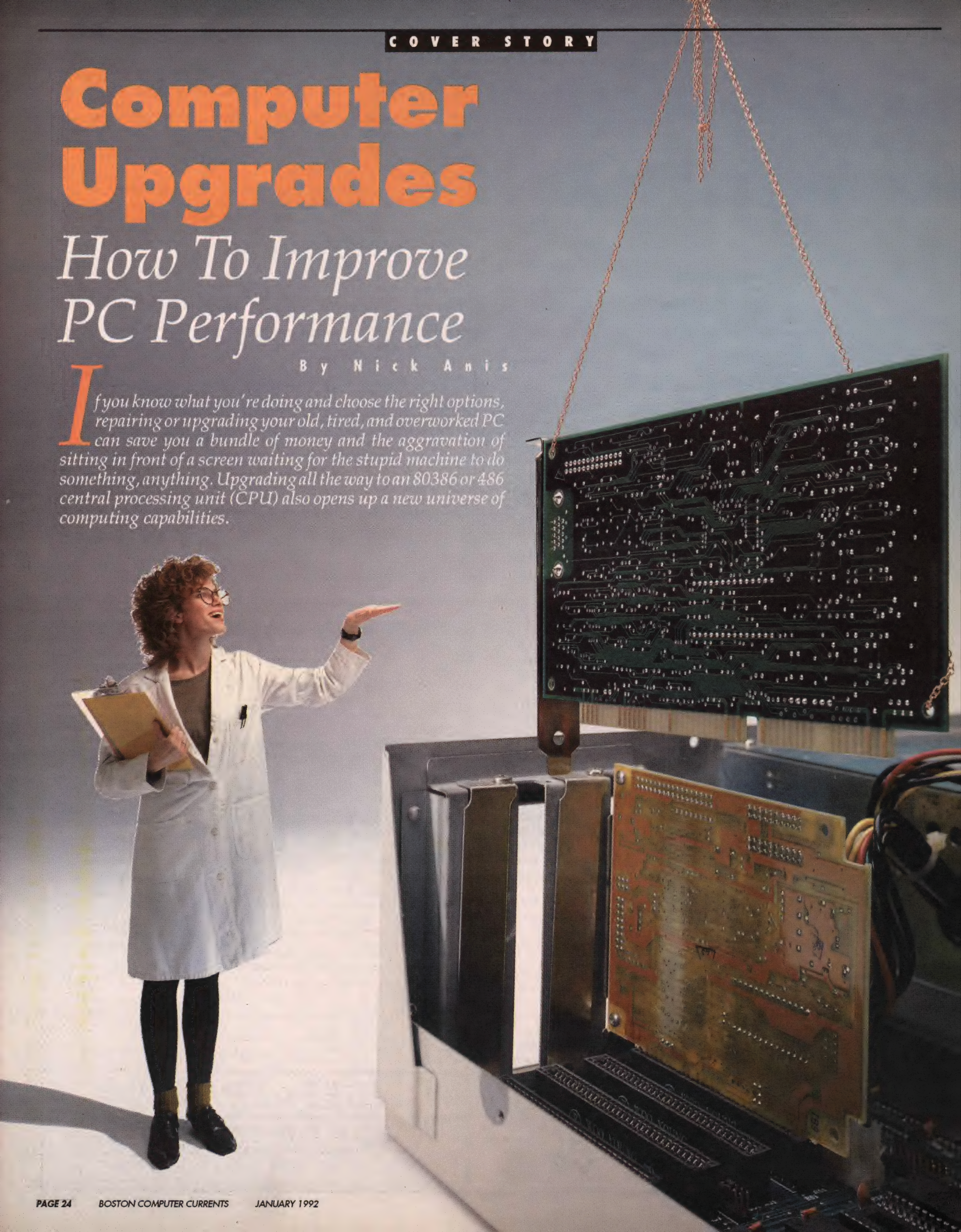
Computer Upgrades

How To Improve PC Performance

By Nick Anis

If you know what you're doing and choose the right options, repairing or upgrading your old, tired, and overworked PC can save you a bundle of money and the aggravation of sitting in front of a screen waiting for the stupid machine to do something, anything. Upgrading all the way to an 80386 or 486 central processing unit (CPU) also opens up a new universe of computing capabilities.



IBM compatibles have always been designed for expansion and enhancement of peripheral gear. Expansion slots in virtually every machine beg to be filled with video cards, game ports, modems, accelerator boards, etc. But the CPU, which sets the limits of what you can do with all those peripherals, has only recently become a "pick-and-plug" option. We'll focus here on ways to enhance your system's processing power and software with upgradable CPUs, plug-in CPU cards, accelerator cards, and motherboard replacements.

Dozens of clone makers offer such upgrade options, so we won't be able to cover them all. Many of the products discussed here are available from vendors advertising in this issue. Part of the fun of shopping can be reading about all the new technology being developed and then finding a dealer who has a similar, less expensive product.

Power Considerations

Before attempting any upgrade, be sure you have enough electrical power to support it. Hard disk crashes on power-up are the most common and devastating catastrophe trackable to power starvation. A worn-out or anemic power supply will also cause your PC to run hot, leading to premature component failure, unreliable operation and frayed nerves. Replacing the power supply with one of greater capacity and better cooling ability will keep your system's temperature (and yours) normal and likely save you the expense of other more costly repairs.

If you plan to upgrade to an 80286 or 80386 CPU and run just one or two hard drives, a 150-200 watt power supply is a must. If your power supply is rated lower, you can replace it yourself for about $50. More power-hungry systems may require 200-400 watts; such boxes may cost $75 to $200. The larger power supplies tend to have bigger and quieter fans, and usually include more than the standard six power leads for connecting internal devices.

Upgrading A Basic PC

PC/XT clones sporting 8088/86 CPUs are not good candidates for processor upgrades. Even an 80286 upgrade may require extra investment in faster RAM (random access memory), a modern BIOS (basic input-output system), and high-density floppy drives to match the new CPU's capabilities. Smart shoppers can often buy a new AT-class machine for less than the total "real" cost of an XT-to-AT upgrade. Seriously consider passing down your 80XX machine to the kids, or turning it into a second terminal before spending much money on these kinds of upgrades.

That said, an XT-to-AT upgrade should begin with a replacement motherboard that fits in the XT's relatively small case; these are typically marketed as "baby AT motherboards." They're available for around $100. You can also buy a full-sized AT case and motherboard and plug in most of your old XT's parts like the floppy and hard drives. An AT-class motherboard is essential for the plug-in CPU modules we'll be discussing, which all plug into the 80286 chip socket on the motherboard. Although there are baby AT 386 motherboards that will fit the smaller XT-style case, its much easier to add 386 or 486 motherboards to a standard AT-class system which has a full-sized case and higher-capacity power supply.

If you already have an AT motherboard running an Intel 80286 CPU, you have two upgrade options: replace the motherboard or just the CPU chip. As long as the CPU chip on your motherboard is socketed, the latter choice is easier to install, but it may not cost much less than a full motherboard/CPU replacement. These pick-and-plug options go by several names: CPU upgrade modules, turbo cards, accelerator cards, even "motherboard Band-Aids."

Cumulus Corporation, of Cleveland, Ohio, is offering their 386SX Upgrade module, bundled with Microsoft Windows 3.0, for $299. This product is designed to offer 386 compatibility. It's a 1 1/2-inch square module bearing a 16-megahertz 386SX processor that just plugs into the 286 CPU socket and doesn't require any expansion slots. A software driver included with the module may be needed for certain programs run outside of Windows. If you plan to run any programs outside of Windows, all you need to do is modify your CONFIG.SYS to include the command to load (or loadhi) this driver when the system boots.

The Cumulus 386/SX CPU upgrade module *does not* offer dramatic speed improvements over 80286 processing; a 10- or 15-percent gain with certain programs is about all you should expect. The two key benefits of this product are the abilities to run 386 software and use expanded memory. A generic expanded memory manager is also included that can be used to convert extended memory to expanded memory. The product is also compatible with third-party expanded memory managers like QEMM or 386Max. It also provides support for a 387SX math coprocessor. The $300 list price is a good value considering that Windows, which list for $149 and sells for about $95, is bundled with it. The 386SX processor is also available in five models to ensure full compatibility with most 286-class PCs. An optional $25 cable assembly is required to install a 387SX coprocessor.

Cumulus also distributes a privately labeled line of PCs including 386SX- and 386DX-based systems, with prices ranging from $1,195 to $2,095 depending on configuration. Cumulus PCs can be upgraded to 486-based systems and are bundled with Windows, DOS

SEE NEXT PAGE

LOGIC saves LCS

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**386SX-20 SVGA SYSTEM W/42M HD ->$1109
**386-25 SVGA SYSTEM W/105M HD ->$1329
**386-33 W/64K CACHE 4M / SVGA SYSTEM W/ 105M HD ->$1599
**386-40 W/64K CACHE 4M / SVGA / 105M HD ->$1649
**486-33 W/64K CACHE/4M RAM/125M HD/ 1MEG SVGA SYSTEM/SUPER TOWER CASE OR AT-CASE ->$1999

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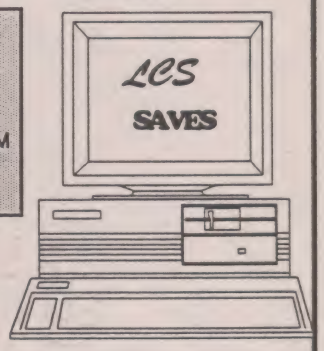

**Note:: prices above is upgrade with computer system only

POCKET MODEM (2400 BD) = $99
2400BD INTERNAL MODEM = $60
9600BD SEND/RECEIVE FAX-MODEM = $109
RVGA CARD (800X600) = $49
SVGA CARD W/512K (1024X768) = $79
512K SVGA CARD WITH SVGA MONITOR = $379
1M SVGA CARD WITH SVGA MONITOR = $409
RVGA CARD WITH RVGA MONITOR (.41) = $269
LASER PRINTER (HP, PANASONIC) CALL
MATH COPROCESSOR CALL FOR BEST PRICE
NEC 3D, SONY 1304 MONITOR == CALL

TRACKBALL TRUEDOX = $35
3 BUTTON MOUSE = $21
WINDOW 3.0 W/ MOUSE = $85
101 KEY KEYBOARD (XT/AT) = $35
PANASONIC KXP-1180 = $159
PANASONIC KXP-1123 (24PIN) = $219
PANASONIC KXP-1124i = $295
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COLORADO 250M TAPE BACKUP = $335
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IRWIN 250M TAPE BACKUP = $295

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Take 93 to exit 7. Then exit 18 (Washington St). Left onto Washington. First right onto Church St. Take first right onto Old Elm Street. LCS is right in front when you are under the bridge.

FROM PREVIOUS PAGE

and Microsoft Works.

Aox Stax offers another 286-to-386 upgrade module. This one also includes the company's own CCC/SX caching chip. Their 16MHz version lists for $279 and the 20MHz version is $329.

SOTA (State of the Art Technologies) offers a tried-and-true upgrade module officially called the Express/386 ("the soda card" to some of its fans). Listing for $495, it will convert an 8MHz IBM AT into a 16MHz 386. They also have a 20MH zcard for $595 and a 25MHz model for $695. Some systems may also require a $110 "universal adapter" kit. SOTA's modules all come with a small 16K cache and can use any memory in the system. The Express/386 doesn't include a memory manager. The memory management software included with MS-DOS 5, HIMEM.SYS and EMM386.EXE, will work, or you can use third-party memory mangers like QEMM or 386Max.

Some people advocate replacing an entire motherboard, not just the CPU. They argue that motherboards are integrated systems in which all components should be equally matched. Grossly mismatched components can cause problems or yield poor performance, e.g., an 80386 33MHz processor may lock up if it has 120ns RAM chips, and a 8-bit XT-style hard disk controller will run lousy on an AT system that normally uses a 16-bit hard disk controller. If your XT motherboard has only 8-bit expansion slots, you'll be limited to peripherals in that class. So if your base system (power supply, case, and motherboard) is seriously under-equipped, replace the whole enchilada.

A new 386/33 motherboard with 64K cache and 4MB of RAM will cost you about $500 when installed by a professional. If you don't swap motherboards for a living, the job should take about three or four hours. I used to have a technician, Juan Hernandez, who could gracefully drop one in and make all the right connections in about 15 minutes. I miss Juan, not just because he was skilled, fast, and used to let me win at tennis, but because switching motherboards without Juan can get tricky. A lot can go wrong while sliding the system out of its case and pulling the motherboard. Screws can get stripped or lost and you're in for the "shock of your life" if you screw up reconnecting the power cables.

Doing It Yourself

But if you have the patience, dexterity, tools, necessary parts and instructions, you'll learn a lot about your system by doing your own upgrades. Some good reference books include: *The Winn Rosch Hardware Bible*, by Winn L. Rosch, Brady, 1989, 628 pp.; *Upgrading and Repairing PCs*, by Scott Mueller, Que Corporation, 1988, 724 pp.; and *Upgrading PCs Made Easy*, by Bud Aaron and Alex Aaron, Osborne/McGraw-Hill, 1991, 459 pp.

Whichever upgrade path you take, make sure you have all the tools you'll need before you start. A $10-$20 computer toolkit will include several flat and Phillips-head screwdrivers, male and female nut drivers, tweezers and

Low-Cost Windows Speed-Up

Weitek Corp. is planning to release its Weitek Power for Windows adapter card early this year. A prototype of the $299 product was used for our cover shot. Specifically designed for business applications, the board increases the performance of spreadsheet, word processing and other Windows applications two to four times, according to the company. Performance improvement is particularly noticeable in such functions as text scrolling, cut and paste, spreadsheet screen navigation, moving and resizing Windows and line drawing. "Weitek Power for Windows reduces the time users have to wait for their computers to catch up with them when working in Windows," said Art Reidel, General Manager of Weitek's User Interface Processors Division. In addition to Windows the half-slot, 16-bit card also includes drivers for AutoCAD versions 10 and 11. Contact Weitek Corp., Sunnyvale, Calif. at 408/738-8400.

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(vital!) a three-prong pick-up tool for retrieving screws dropped into tight spots on the motherboard. A pencil with two-faced tape on the end will serve for a pickup tool; *never* use a magnetic tool around a motherboard! If you'll be replacing CPU chips, buy a kit with a specialize chip-pulling tool. It cuts down on profanity and helps avoid bending the delicate pins along a chip's edge. A clip-on gooseneck minilamp or a penlight you can comfortably hold in your teeth completes the essential toolkit.

Unplug the computer to protect yourself, and take anti-static measures to protect your circuitry. It's a good idea to remove rubber-soled shoes, avoid working in very dry air, and lightly mist the carpet around the workbench with one tablespoon of liquid fabric softener in a pint of water. Now make sure you have enough space and light to work, get yourself a soft drink (refreshments always make work easier) and remove the computer's cover.

Make written notes and rough sketches of your system's DIP (dual in-line pin) switch and jumper settings before you start changing things. It wouldn't hurt to label your cables and connectors either.

Wipe the sweat off your palms, take a few deep breaths and a swig of soda, and follow the vendor's installation instructions. You'll be enjoying more powerful computing in just a couple of hours.

Modular PC's

PC technology often seems to advance too fast. Before you get the cover back on your upgraded machine, somebody somewhere will release a new "breakthrough" component. New technology generally means free-fall prices for older devices. Don't bother looking back at the price for the system you just bought, or eyeballing the models that supersede it; doing so will only give you a healthy case of the "I could have hads."

The advent of "modular" PC should offer some relief to these problems. A true modular PCs is designed so the average user or dealer sales rep can snap in expansion/upgrade options without much screwing, plugging and switching. (No double meaning intended with these terms...) A good example is Tandon's modular system, which has snap-in modules for CPUs, floppy and hard drives, and memory chips. Most of the systems from other manufacturers are not really much more than units with Intel's new upgradable CPUs.

CPU upgrades are easier and more cost effective with modular PCs. The next computer for millions of 8088/86 and 80286 users may well be an 80386 modular PC or at least one with an upgradable CPU. Investing in this kind of a system will make it easier and more economical for users to switch to an i486 when they get the upgrade urge.

Several manufacturers now offer modular PCs. Most are slimline desktop units, though some tower configurations are available. Most modular systems range from 25MHz 386DX workhorses to 33MHz i486DX screamers.

Touche Micro seems to have some of the lowest modular system prices and a full range of offerings from i386 16MHz to i486 50MHz. They also have an excellent plug-in CPU module. What impressed me most, though, is they are the only ones that include Sony monitors and CD-ROM drives, along with a valuable collection of software on CD ROM discs.

Acer, who also offers very competitive prices, starts with the i486SX 20MHz and offers upgrades to i486DS 33MHz or the highly-touted single and dual i486DX chip. Some i486 upgrade modules disable the existing i386DX chip, as is the case with Dell and Touche Micro. This design lets you leave the i386 chip in place or remove it if you wish. On the Tandon and Northgate computers, the 386DX is itself a removable module.

Acer has made a name for itself for great PC network workstations and file servers. Acer's entry-level modular 486 system, the AcerPower 486SX, is an ISA (industry-standard architecture) system based on an i486 SX 20MHz. Upgrading this $2,495 system to either a i486DX 25MHz ($250-$300) or 33MHz ($375-$400) is as simple as plugging the new microprocessor into a separate socket. The system automatically recognizes the new chip and changes all other settings to take advantage of the new power.

Acer sells three other modular EISA (extended ISA) systems. The AcerPower 500 is a $3,395 desktop system based on the i486SX 20MHz and can be upgraded using plug-in modules to a 33MHz ($1,795) or 50MHz ($2,495) model. This system will also automatically detect and configure itself for the processor installed. Acer is offering a $200 rebate if users turn in their AcerPower 500 i486SX board.

Tandon Computers Corporation's Option system starts with a truly barebones chassis for $995, not including a hard disk or the microprocessor. Some of the options for the Option include a 286 microprocessor cartridge that costs $895; a standard VGA monitor that costs $279; a Super VGA monitor for $329; a 40MB hard disk for $349; and a 110MB hard drive for $599.

Tandon's modular options may be the easiest to install of all the modular and upgradable systems vendors discussed. The Tandon CPU module is a single piece that just snaps into place. Touche and Northgate use two-piece connectors for their upgradable CPUs, and Dell uses a PS/2 Micro Channel-like connector that requires three screws to attach the CPU card to the motherboard.

Arche Technologies, Inc., based in Fremont, Calif., has two upgradable

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88 Meg-19ms-1:1 interleave IDE	$300
105 Meg-15ms-1:1 interleave IDE	$350
130 Meg-19ms-1:1 interleave IDE	$395
210 Meg-15ms-32k cache-1:1 interleave IDE	$650
670 Meg-15ms-SCSI-cache-Adaptec 1522	$1750
1.2 Gig-15ms-SCSI-cache-Adaptec 1522	$2350

Monitor and Video Card Options:

Monochrome monitor w/graphics/printer	$129
.39mm VGA color (640x480) w/256k vid card	$299
.28mm **AOC** SVGA (1024x768) w/512k vid card	$425
Panasonic C-1381 i Super VGA monitor- .28mm (1024x768) Trident 1024k vid card	$489
AOC non interlaced Super VGA monitor- .28mm (1024x768) Trident 1024k vid card	$500

Other Options:

CD-ROM disc drive w/interface	$369
Second high Density floppy	$59
Additional Meg of 80ns Ram	$50
Switchable Resolution Mouse	$29
Windows 3.0 w/ Microsoft Compatible Mouse	$75
MS-Dos 4.01 (5.25" or 3.5" discs)	$50
MS-Dos 5.0	$59
250 Meg Tape Backup	$349

386/33-64k cache
4 Meg Ram-Expandable to 16
Choice of 5.25 or 3.5 High Density Floppy
Choice of 5 device Mini Tower or Desktop case w/200 watt
Dual hard and floppy controller, 2 Serial Ports,
Parallel & Game ports, 101 Key Soft Click Keyboard
only ***$ 899***

386/40-64k cache !!
4 Meg Ram-Expandable to 32
Choice of 5.25 or 3.5 High Density Floppy
Choice of 5 device Mini Tower or Desktop case w/200 watt
Dual hard and floppy controller, 2 Serial Ports,
Parallel & Game ports, 101 Key Soft Click Keyboard
only ***$ 949***

486/33 ISA !!!!
4 Meg Ram-Expandable to 32
64k fast Ram cache - 5.25 or 3.5 High Density Floppy
Choice of 5 device Mini Tower or Desktop case w/200 watt
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Mini Directory for PC Upgrades*

Books

The Winn Rosch Hardware Bible
By Winn L. Rosch
Brady Books
New York, NY
212/373-8093
212/373-8192

Upgrading and Repairing PCs
By Scott Mueller
Que Corporation
Carmel, IN
800/428-5331
317/573-2500

Upgrading PCs Made Easy
By Bud Aaron and Alex Aaron
Osborne/McGraw-Hill
Berkeley, CA
800/227-0900
415/548-2805

Upgrade Your IBM Capatible And Save A Bundle
2nd Edition
By Aubrey Pilgrim
TAB Books
Blue Ridge Summit, PA
800/822-8135

Memory Managers

QEMM 6.0 386 memory manager
Quarterdeck Office Systems
150 Pico Boulevard
Santa Monica, CA 90405
213/392-9851 General
213/399-3802 Fax
213/392-9701 Technical support

386Max, 386 memory manager
Qualitas, Inc.
7101 Wisconsin Avenue
Suite 1386
Bethesda, MD 20814
800/733-1377
301/907-6700
301/907-0905 Fax
301/907-7400 Technical support

Hard Disk Controllers

Adaptec, Inc.
691 South Milpitas Boulevard
Milpitas, CA 95035
408/945-8600 General
408/262-1845 Fax
408/945-2550 Technical support

Western Digital Corporation
8105 Irvine Center Drive
Irvine, CA 92718
800/832-4778 Sales
714/932-5000 General
714/660-4909 Fax
Use toll-free number for technical support

CPU Upgrade Modules and Expansion Products

Aox
486 Totten Pond Rd.
Waltham, MA 02154
617/890-4402

Cumulus Corporation
23500 Mercantile Road
Cleveland, OH 44122
216/464-2211
216/464-2483 Fax

Diamond Micro Solutions
1615 Alvarado St.
San Leandro, CA 94577
800/366-4367
510/351-4700
510/352-1089 Fax

Intel Corporation
3065 Bowers Avenue
Santa Clara, CA 95051
408/765-8080
408/765-1821 Fax

Intel Corp. (Arizona Systems Division, BIOS)
2402 West Beardsley
Phoenix, AZ 85027
800/888-0609
602/869-3805

Performance Pursuit, Inc.
18 Crow Canyon Court
Suite 180
San Ramon, CA 94583
510/838-2171

Accelerator Cards

MicroWay, Inc.
P.O. Box 79
Research Park
Kingston, MA 02364
508/746-7341
508/746-4678

Sota Technology, Inc.
559 Weddell Drive
Sunnyvale, CA 94089
408/745-1111 General
408/745-1640 Fax

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1.2MB and 1.44MB Flopy Disk Drives
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101-key Keyboard, Mini Tower Case
$1542

486-33/64K Cache
4 Meg RAM, 40MB Hard Disk Drive
1.2MB and 1.44MB Flopy Disk Drives
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101-key Keyboard, Mini Tower Case
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386-40/64K Cache Server
4MB RAM, 120MB HDD, 1.2MB FDD
14" Monochrome Monitor
16-bit Ethernet Card
101-key Keyboard, Medium Tower Case.
$1837

386-40/64K Cache Workstation
1MB RAM, 1.2MB FDD, Mini Tower Case
14" Super VGA Monitor w/512K VGA card
2S/1P/1G Ports, 8-bit Ethernet Card
$1433

SX16 VGA Workstation
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14" VGA Monitor w/256K VGA card
2S/1P/1G Ports, 8-bit Ethernet Card
$1073

* With Purchase of Network Software.

Mini Directory for PC Upgrades*

PC Motherboards

Baby 286 Motherboard Model 2C12
Baby 386 Motherboard Model 8E
C2 Micro Systems, Inc.
47448 Fremont Boulevard
Fremont, CA 94538
415/683-8888 General
415/683-8893 Fax

DTK Computer, Inc.
(div. of Datatech Enterprises Co., Ltd.)
17700 Castleton Street
City of Industry, CA 91748
818/810-8880
818/810-5233 Fax
818/810-0098 Technical support

Micronics Computers, Inc.
232 East Warren Avenue
Fremont, CA 94539
800/234-4386 Sales
415/651-2300 General
415/651-5612 Fax
Use general number for technical support

Mylex Corporation
34551 Ardenwood Boulevard
Fremont, CA 94555-3607
800/77-MYLEX Sales
415/796-6100 General
415/745-7564 Fax
Use general number for technical support

Modular PCs

Acer America Corporation
401 Charcot Avenue
San Jose, CA 95131
800/421-2844 Sales
408/922-0333 General
800/637-7000 Technical support

Arche Technologies, Inc.
48881 Kato Road
Fremont, CA 94539
800/422-4674
415/623-8100
415/683-6754 Fax
800/322-2724 Technical support

AST Research Inc.
PO Box 19658
16215 Alton Parkway
Irvine, CA 92713-9658
800/727-1278
714/727-4141
714/727-9355 Fax
Use toll-free number for technical support

Compaq Computer Corporation
P.O. Box 692000
Houston, TX 77269-2000
800/231-0900 Sales
713/370-0670 General
713/374-1402 Fax
800/345-1518 Technical support

Dell Computer Corporation
9505 Arboretum Boulevard
Austin, TX 78759-7299
800/426-5150 Sales
512/338-4400 General
512/338-8421 Fax
800/624-9896 Technical support

Northgate Computer Systems, Inc.
P.O. Box 59080
Minneapolis, MN 55459-0080
800/548-1993 Sales
612/943-8181 General
612/943-8336 Fax
800/446-5037 Technical support

Polywell Computers, Inc.
61-C Airport Blvd.
South San Francisco, CA 94080
415/583-7222
415/583-1974 Fax

Tandon Corporation
301 Science Drive
Moorpark, CA 93021
800/800-8859 Sales
805/523-0340 General
805/529-8408 Fax
800/487-8324 Technical support

Touche Micro Technologies
(a PC Pros Co.)
8205 South Cass Avenue
Darien, IL 60559
708/810-1010 General
708/810-9490 Fax

Zeny Computer Systems
4033 Clipper Ct.
Fremont, CA 94538
415/659-0386

** This "Mini Directory" is designed to be a starting- point resource that includes all the companies mentioned in this article. It is not intended as a comprehensive listing of all the product categories, which could easily fill an entire magazine.*

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- SVGA CARD (1MB)
- 101-KEY KEYBOARD

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386SX
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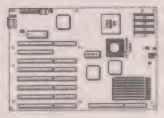

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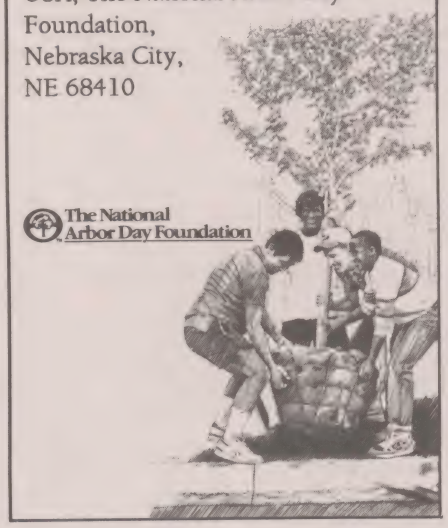

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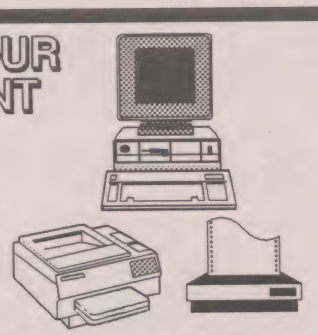

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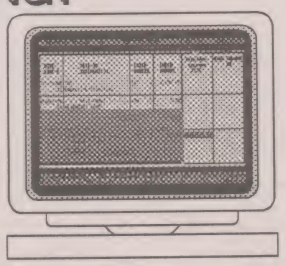

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i386 machines. Arche's Master Line includes a i386 25MHz PC upgradable to an i486 25MHz screamer. They also have an i386 33MHz desktop model that can be upgraded to an i486 33MHz system.

Each of the Arche PCs includes 128K of cache, an ISA bus, eight expansion slots, MS-DOS 5.0, Windows 3.0 and 4MB of RAM (expandable to 32MB). The upgradable i386 25MHz unit lists for $3,299, and the i486 25MHz upgrade card lists for $1,999. The upgradable i386 33MHz PC goes for $3,999, and their i486 33MH zupgrade card costs $1,999.

MicroWay, Inc., offers a FastCache-SX/Plus accelerator board for $695. This plug-in CPU card will give a 80286-based PC machine true i386SX performance, not just compatibility. The MicroWay FastCache is actually a 16-bit single-board computer complete with a 20MHz i386 and room for up to 8MB of RAM.

Installing the MicroWay board involves removing the motherboard's BIOS and CPU chips and plugging the FastCache board into an available 16-bit slot. A CPU extension cable is also needed to connect the CPU socket on the motherboard. The FastCache is slightly slower than true i386SX machines but its a good alternative for i286 users who need i386 speed as well as compatibility.

AST Research has their Fastboard line which offers what they claim is a "completely universal processor." The Fastboards are easy to upgrade since they have the components most likely to change, such as the microprocessor and the memory. Several Fastboard upgrades are available including 486/33 with 8MB of RAM, $3,045; 486/33 with 4MB of RAM, $2,595; 486SX/20 with 4MB of RAM, $1,595; and 386/33 with 4MB of RAM, $1,545.

These cards don't have provisions for changing the BIOS or disk I/O which are almost always located on the motherboard. This may be a problem for Fastboard owners. The new 3 1/2-inch 2.88MB floppy drives will require a change to the BIOS, one of the parts not affected by Fastboard upgrades.

Updating a PC's BIOS has always been a problem. A BIOS chip for sale that's not plugged into a motherboard can be as hard to find as an empty parking space at Comdex. This explains why millions of users are still using buggy pre-1987 BIOSes when they could plug in a new set of ROMs for under $20. Intel finally has a chip that will let users upgrade their BIOSes. The new Intel erasable programmable ROM (read-only memory) chip will allow users to upgrade their BIOSes from software on an ordinary floppy disk. Hopefully, this chip will work its way into the design of new systems before too long.

Upgrading to a regular i486-chip processor will give you more than a faster chip.

There is less incentive to upgrade if you already have a 386-class system. But upgrading to a regular i486-chip (DX) processor will give you more than a faster chip with a built-in math coprocessor. The i486DX also has an internal static RAM cache of 8K, 64K, or 128K-512K. Most 486 machines have a more advanced BIOS. I use two 33MHz i486-based computers side by side at my desk. (I like to think of my dual computer setup as a less-complex form of parallel processing.) The added speed and performance of the i486 versus the i386 is amazing, even though both classes of chip are 32-bit devices. A 486 is better, but is it worth the expense and effort to upgrade? Intel has complicated the answer by introducing an Intel-lectually dead 486SX chip. This i486SX dog has no cache and no coprocessor. Investing in one of these chips makes little sense right now because anything one of these i486SX dogs can do, a i386 can do. Until this changes, get a i486DX, or stick with a i386 chip.

Intel has already promised price reductions in their microprocessors and started shipping plug-in CPU upgrades to their original equippment manufacturers (OEMs). This explains why so many computer makers are offering system designs with upgradable CPUs. Intel has also hinted that their "P5" or 586 chip is near completion. According to my sources, OEM sampling is scheduled for mid-1992.

Although I've just converted my two desktop systems over to i486 33MHz ISA and EISA machines, it won't be long before a faster 486 chip is shipping in quantity or the i586 is released. Then I can begin the upgrade process all over again. Next time, though, I'm going to get an upgradable CPU in one of the new generation of modular PCs.

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Nick Anis is a freelance writer and co-author of several best-selling computer books, including ***Dvorak's Guide to PC Telecommunications, Glossbrenner's Complete Hard Disk Handbook, Dr. File Finder's Guide to Shareware, Dvorak's Guide to DOS*** *and* ***PC Performance and The PC User's Guide****. Write to him at 1125 Bramford Court, Diamond Bar, CA 91765, or MCI Mail ID 389-1702, NANIS, or via his bulletin board at 714/396-0014.*

By Rick Altman

I've Become a SCSI Evangelist

Add-In Card Offers Greater Speed and Flexibility

Despite all of this talk about larger hard drives, more memory, and faster processors, you know what has become the most precious computing resource for me? Available slots on my motherboard.

High-resolution display... scanner interface card... printer accelerator board... modem... tape drive... CD-ROM drive... all of these require an open slot on a PC. A manufacturer sent me one of those fancy mice with all of the buttons, and I couldn't evaluate it without tearing apart my computer, because I had no free slots to place the mouse card. Something had to be done.

This was the genesis of my decision to explore the advancing SCSI (pronounced "scuzzy") technology that has begun to make inroads on the PC. I have come to learn that the so-called "small computer system interface" has many other benefits as well, but the characteristic for which it is best known is its ability to service several peripherals through one adaptor. Like other controller cards, a typical SCSI card supports two floppy drives and two fixed drives. But in addition, its port on the back of the card provides access to another SCSI device, and that device can connect to another one, and so on. It's called *daisy-chaining* — the ability to connect peripherals in a series, the first one connecting to the adaptor card, and each subsequent one connecting to the previous one.

The only other thing I knew about SCSI technology was that it has not been as stable or reliable running on the PC as it has been for years on the Mac. So what's another non-standard standard among friends...?

When I made my purchase I decided to stay with well-known brands. I bought three components: an Adaptec SCSI controller card, a Maxtor 340MB drive, and an Archive tape drive. My hopes were to use the tape drive as the second internal drive and to connect my CD-ROM externally as the third device. If successful, that would result in a savings of two slots right there, as my existing non-SCSI tape drive consumed a slot, as did the CD-ROM drive.

It is desktop publishing nirvana to have so much hard drive space.

My first order of business was to install the SCSI drive in my system while the other drive was still running; that way, data transfer could be done directly from one hard drive to another (no backup-and-restore chaos). SCSI controllers can co-exist with others in the same system, so I simply created an open slot and plugged it in. The first thing I noticed about the drive was its small physical size, that of a 3 1/2-inch drive. The second thing I discovered was that I did not need to initialize it — all low-level formatting is done at the factory. And perhaps best of all, no drive ID number to remember. In fact, when you run your on-board SETUP, you tell it that there is NO DRIVE PRESENT. The controller automatically finds the drive and reads it.

This was unquestionably the simplest hard drive installation I've ever

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experienced; on its first reboot, my system recognized a drive D that wasn't there before. I ran FDISK, ran FORMAT, and then issued the command XCOPY C:*.* D: /s to copy everything from the old drive to the new. At that point, I encountered what I thought was my first problem: filenames were scrolling way too fast and nothing was copying. At least, I didn't hear anything copying. I looked at the SCSI drive, and the light was blinking but it wasn't making any sound. I pressed my ear next to it and heard a faint whirring sound. This was no malfunction — it was simply the quietest and fastest drive I had ever seen in my life.

The new drive copied over 100MB in about five minutes. Then I removed my old drive, flipped one switch on the SCSI drive telling it to be the first drive in the system, and rebooted. Up came my CONFIG.SYS, there went DOS 5.0, all of the familiar messages in AUTOEXEC flashed, and up popped Windows 3.0 — all on the first try. The drive loaded PageMaker and Ventura Publisher — each in less than half the time and with none of the usual grinding sounds — and cut through a 450K color TIFF file with the ease of a Ferrari merging onto a freeway. You don't realize how important hard drive speed is to overall performance until you make such a dramatic switch.

I wasted no time uploading to my new drive my entire font library and clip art collections — previously banished to floppies for want of disk space.

Next came the tape drive; it was even easier. It connected just like a hard drive, and with the appropriate drivers placed in memory and with the right software, it also ran on the first try. The tape cartridges hold 150MB each, and with minimum compression, I can back up the entire drive virtually unattended, only having to switch tapes once. What a relief to not have to use floppies anymore.

On to the CD-ROM drive. It was to be the first external device connected to the SCSI adaptor card, and so I expected that if I were to encounter difficulties, it might be here. I was right, but it was operator error: I forgot to tell the CD-ROM that it was now the third drive, not the first, in the chain. Once I did, it came to life as well. The drivers for the tape drive and the CD-ROM consume almost 30K of RAM, and while I could load them high with DOS 5.0, DR-DOS 6.0, QEMM, or 386Max, I choose to keep them commented out in CONFIG.SYS, restoring them only when needed. I use the tape drive once at the end of the day and the CD-ROM less than once a day, so this strategy works well for me.

The new drive copied over 100MB in about five minutes.

I consider my SCSI experiment a resounding success. I experience only my normal share of Windows-based crashes, have had no disk errors whatsoever from the drive, no problems backing up or restoring from the tape, and no errors reading data from the CD-ROM. It is desktop publishing nirvana to have so much hard drive space, and seventh heaven to have such a fast drive. Given the status quo of PC computing, my success doesn't guarantee anyone else's success, but as this technology emerges, it should be at the top of every desktop publisher's list of items to explore.

As for me, I have converted to the SCSI faith, and feel like my next course of action should be passing out flowers and leaflets at the airport.

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Rick Altman has authored books on Ventura Publisher, PageMaker, CorelDRAW, Harvard Graphics, and DESQview. He consults and lectures on corporate publishing throughout Northern California. You can write to him at 20204 Merritt Drive, Cupertino, CA, 95014, or on CompuServe (72341,1714).

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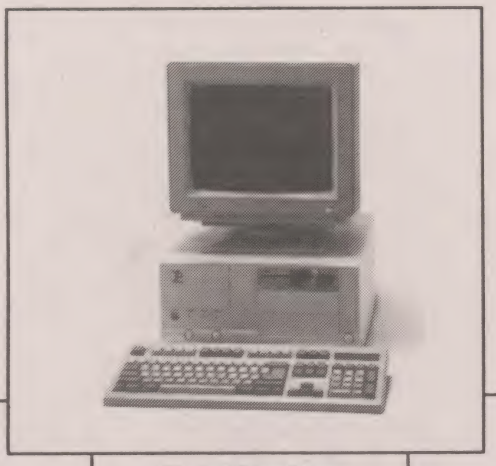

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By Tony Bové

The Best of 1991

It was easy for products to stand out this year — it was a desert for technology and innovation on the Mac side of the personal computer industry. Third-party vendors are optimistic that the introduction of the truly innovative system extension, QuickTime, will "irrigate" this desert with new products. But by and large, the third-party vendors had little to offer as they spent most of their energies making existing applications compatible with System 7.0 and preparing for 1992, the Year of QuickTime.

It was indeed a calm before a storm. 1992 promises to be far more exciting as third-party software vendors learn about how to make competitive use of AppleEvents and QuickTime, and third-party hardware vendors exploit the PowerBooks and the thirst for higher-quality video for multimedia production.

In contrast with the conservative attitude of the third parties, Apple made dramatic positive moves this year, handily winning our Best Product of 1991 award (for the PowerBook 170).

PowerBook 170: Best All-Around Product

Pound per processor, there are faster machines on the market, but the PowerBook 170 provides "the Mac" in your lap, and this does make a considerable difference to us Mac users. Engineered to have a built-in wrist pad, the PowerBooks are the easiest for me to use as a typing machine on the road. I got used to the built-in trackball about an hour after I reset the Control Panel mouse to be very slow. Don't try to use this thing if you're drunk or have the shakes.

The only unfortunate thing about the PowerBook 170 is that it is nearly impossible to get one. It is a wonderful machine because it is a Mac in your lap, which means it connects to AppleTalk networks, SCSI hard disks, and so forth, like a regular Mac. I even played QuickTime movies on it without problems.

I vote the PowerBook 170 as the best PowerBook because it includes the fax/modem capability and the highest-capacity hard disk (80 megabytes). The other PowerBooks are excellent, but I like the 170's screen (active-matrix) and the faster processor. I want to run programs like Aldus PageMaker and MacroMind Director while on the road, I want the best performance and the best screen, and I don't want to fuss with an extra box (the external floppy drive) just to shave 1 1/2 pounds from the unit I carry. The PowerBook 170, with its built-in floppy drive, active-matrix screen, and 68030 processor fits the bill almost perfectly, and certainly better than any other portable machine on the market.

Printers of the Purple Page

There was a considerable battle this year among the printer vendors. Apple weighed in with its best laser printers, the LaserWriter IIf and IIg. The LaserWriter IIf ($3,599) and IIg ($4,599), replacements for the slower LaserWriter IINT, are 300dpi laser printers that offer resolution enhancement for type and line art (called FinePrint), and a higher line screen for gray-scale images (called PhotoGrade).

But the most innovative printer in 1991 is the Tektronix Phaser II PXi, which uses phase-change ink-jet technology (also known as solid ink-jet). The Phaser II PXi ($9,995) is a tabloid-sized color printer that prints on plain paper. It uses a 24MHz RISC controller implementation of Adobe PostScript Level 2. The phase-change ink-jet technology is superior, as far as we can tell, to any other technology for providing high-quality color printing at 300dpi on just about any type of paper or card stock, or on transparencies.

The low-end star was introduced last March. The $599 StyleWriter ink-jet printer offers 360dpi printing in a very small and attractive package. Odd-looking at first sight, the 5-inch deep, 13-inch wide, 12-inch high thermal ink-jet printer weighs only about 7 1/2 pounds and is easily transported. It can print on letter stock, card stock, labels, business envelopes, and 3M transparencies, sports a 50-sheet feeder and a manual feed for envelopes (with a straight paper path), and uses a replaceable ink cartridge with a capacity of about 500 average pages (which should cost only about $20). The StyleWriter connects directly to the serial printer port. It prints at 360dpi at about a half a page a minute, or up to one page per minute in 180dpi draft mode. Above all, this printer is quiet, which is a considerable advantage for home use.

Ofoto!

This product name demands attention, and deserves it. Ofoto, developed by Light Source and bundled with Apple's OneScanner ($1,299), is an excellent image scanning program. The goal of Ofoto is to make it much easier for mere mortals to add scanned images, such as black and white photographs, to any type of document without having to know anything about image processing.

You can use OneScanner with any type of high-end or low-end output device, even a StyleWriter, and get better-than-usual results. The OneScanner hardware really is nothing special — its dynamic range is pretty much like every other 256-level gray-scale scanner on the market. The major difference is Ofoto, which lets you automatically scan an image without knowing anything about the image parameters other than the type of printer to be used.

Fractal Paints a Masterpiece

Earlier this year Fractal Design Corporation introduced Painter, which provides a set of natural media painting tools with a palette of paper textures and grains, custom brush shapes, brush behavior settings and size parameters, and velocity settings for thickness in brush strokes. Painter is designed to be used with a pressure-sensitive stylus such as the Wacom Digitizer Tablet. The program can simulate any real-world brush shape (including a felt-tipped pen), and it supports build-up and mixing techniques as well as anti-aliasing when painting. It uses its own tile-based virtual memory scheme that Fractal claims is faster than System 7's virtual memory (Painter is compatible with System 7). Protected areas (friskets) can be moved and rotated. In the hands of an artist skilled in the traditional methods, Painter can produce fine art that does not look electronically generated.

Scrolling Thunder

Acceleration and 24-bit environments on the Macintosh are entering maturity. We particularly like the SuperMac Thunder/24 board ($4,999), which accelerates both 24-bit and 8-bit modes with GWorld acceleration. A GWorld is a "graphics world" created and stored in off-screen memory that can hold images that are used in updating the screen, providing a place where an image can be created and manipulated and then copied to a visible screen. GWorlds provide a standard way for applications to handle off-screen image processing, and support for GWorlds is built into Apple's 32-bit QuickDraw. By accelerating GWorlds, the Thunder/24 board dramatically speeds up the process of moving the GWorld image into the visible screen area. You can especially appreciate this performance improvement when running a program such as Adobe Photoshop 2.0.

Not all Mac applications support GWorld yet, so make sure your software is compatible if you're interested in the Thunder/24.

Rocket Men

The Motorola 68040 processor was available before Apple created the Quadras (which have problems with software compatibility), but the only way to use one with a Mac was through an accelerator card such as the Radius Rocket. The Rocket ($1,999) offers the fastest Mac II performance available without a Quadra, and it is nearly twice as fast as the Mac IIfx.

Radius recently announced multiprocessing software called Saturn V that allows simultaneous use of the motherboard Mac II (or Quadra) processor and one or more Rocket processors. With Saturn V, a Rocket shows up on the Mac desktop as a separate CPU icon. When you double-click the icon, a window appears containing an entirely separate Mac desktop, including the menu bar. Disk drives from the first Mac appear in the Rocket window as AppleShare volumes. Dragging an application onto the icon launches that application on the Rocket. Cool stuff.

Affordable 3-D

MacroMind Three-D ($1,495) is a professional 3-D animation program that is about one-third the price of other programs in the same category. Three-D is a set of three modules: 3DWorks, a powerful 3-D object-oriented animation program, RenderWorks, a RenderMan-compatible rendering program, and FireWorks, an image compositing and videotape output program. Three-D's key features include a hierarchical timeline score that lets you animate location, perspective or size, and also lets you control shape, color, lighting, cameras, and all rendering attributes.

You can import 3-D models from other modeling programs (such as Paracomp's Swivel 3D) into 3DWorks for animation; a variety of formats (including DXF, IGES, Sculpt 3D, and Super 3D) are supported. Text in TrueType outline fonts can be extruded to make 3-D characters. Multiple cameras and lights can be manipulated in 3-D space. RenderWorks renders animated sequences in color with 8 or 24 bits per pixel. FireWorks lets you

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FROM PREVIOUS PSGE

composite 2-D and 3-D animations with anti-aliasing and create a series of still images that can be imported into other programs such as Director and MediaMaker. You can also use FireWorks to output 32-bit animations frame-by-frame to videotape using a Diaquest video controller.

Video In and Out

Desktop video is a fast-growing category. The video-in-a-window cards are in their second and third generations. This year's important product is the RasterOps 24STV real-time video processing system ($1,795), which combines 24-bit color, digital video integration, graphics acceleration, video overlay, and image compression into a single-slot product for NuBus slots (Macintosh II models).

With the 24STV system, you can capture images from a variety of video formats, and compress the images for storage on a hard disk, or overlay the video with computer-generated titles and graphics. A daughterboard with an accelerator, or with both an accelerator and real-time video compression and decompression circuitry, can be added to the basic video card. The 24STV may be a hot card for 1991, but it is already facing stiff competition from QuickTime-compatible cards slated for 1992.

To get video out of your Mac and onto videotape (or to view it on an NTSC monitor), you need a scan converter. VideoLogic this year introduced the Mediator ($2,995), a portable graphics-to-video scan converter for converting Macintosh and PC display output signals into composite or S-video signals that can be recorded onto videotape. The Mediator automatically adjusts for PC or Macintosh input signals, and lets you select overscan/underscan, adjust the flicker, freeze a frame, sharpen the picture, align the graphic image, and select NTSC or PAL video output. The unit is no larger than an Apple CDSC CD-ROM player and can be used in different countries with no special hardware or software.

Multimedia Content: Mostly Kid Stuff

It is hard to believe that people would shell out $90 for a computer game, but this game is something special. Spaceship Warlock (developed by Reactor, and available from Educorp for $89.95) is a science-fiction epic on CD-ROM, designed as an adventure game, that was created with MacroMind Director and runs on a Macintosh II with a standard 13-inch (640 by 480 pixel) color display. It takes more than six hours to run through the entire interactive movie even if you know exactly what to do at each point, but after playing several hours, I think it would take more than eight weeks. Warlock is a milestone in the progress of interactive media and a must for anyone interested in multimedia content.

Honorable mention must go to Verbum Interactive, the $49.95 "multimedia magazine" on CD-ROM from Verbum Inc. The disc emulates the look and feel of a magazine, with an interface in which you actually turn electronic "pages" to update the computer screen. The first disc (a 2-disc set) offers numerous examples of multimedia art and animation, with rock songs by Todd Rundgren, Graham Nash, D'Cückoo and other artists, which can be played on ordinary audio CD players, or played on CD-ROM players so that you can click on interactive animation to play the music, and see animation in sync with the music.

Another winner for 1991 is KidPix ($49.95, Broderbund). You know a program is important when nearly every computer journalist you talk to has a copy and their kids love it. KidPix, offering an incredible collection of goofy painting tools and sound effects, is still a big hit with my two-year-old (and has been a hit with him since he was 15 months old).

Tales of Brave Utilities

There is no utility more useful than Symantec's Norton Utilities for identifying and fixing problems with disk drives. Norton provides automatic disk repair, data recovery, diagnostic information, and disk optimization.

Of course, all utilities are potentially useful. One I use often is Aladin Systems' StuffIt Deluxe 2.0 ($99.95), which provides file compression and archiving and the ability to create self-

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unstuffing files.

Another useful utility is FontMonger ($99.95, Ares Software), a type conversion and modification program that performs font conversion in any direction, supporting Type 1, Type 3, and TrueType fonts. Type can also be converted into Adobe Illustrator or Encapsulated PostScript (EPS) files. Graphics and files can then be combined and installed back into a font. Characters from various type families can be combined into a single font, and small cap and oblique typefaces can be created from an existing typeface by selecting the height/width proportions or the degree of slant.

I also use the new version of Timbuktu and Timbuktu/Remote from Farallon Computing, which lets me share color screens across networks and remotely through modems. Two people can look at the same screen, no matter where they are (since Cheryl and I work in separate offices, this feature is helpful). Timbuktu also makes it easy to transfer files to and from other computers on the network. Timbuktu/Remote is essential for taking a PowerBook on the road, so that I can visit my office computer and search through files and retrieve information that doesn't all fit on my PowerBook disk.

That's it for 1991. Expect QuickTime to clobber the video card market in 1992 with new products, and expect a flood of video editing software. Meanwhile, dip into those savings for the next round of upgrades, in which most software products will be made (finally) 32-bit "clean" and therefore compatible with the Quadras. And who was it who said machines would someday adapt to humans?

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When not packing and unpacking boxes of loaner equipment, Tony edits several newsletters with his partner Cheryl Rhodes, including the ***Bové & Rhodes Inside Report on Multimedia*** *and the* ***MacroMind Developer Letter****. For details, contact him on MCI Mail (TBOVE), CompuServe (70105,722), or AppleLink (D0493), or by writing to Bové & Rhodes, Box 1289, Gualala, CA 95445.*

Contact Info

Aladdin Systems
Deer Park Center
Suite 23A-171
Aptos, CA 95003
408/685-9175

Apple Computer
20525 Mariani Avenue
Cupertino, CA 95014
408/996-1010

Ares Software Corp.
P.O. Box 4667
Foster City, CA 94404
415/578-9090

Broderbund
17 Paul Drive
San Rafael, CA 94903
415/479-1700

Educorp
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San Diego, CA 92121-2410
800/843-9497

Farallon Computing
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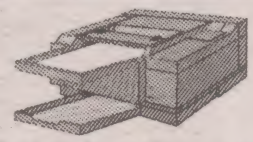
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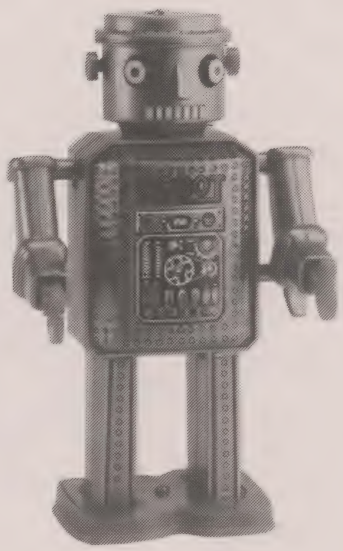
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03 ☐ Manufacturing other
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05 ☐ Transportation
06 ☐ Communications
07 ☐ Utilities
08 ☐ Computer related retailer
09 ☐ Non-computer related retailer
10 ☐ Finance, banking, insurance
11 ☐ Real estate
12 ☐ Health, medical service
13 ☐ Legal
14 ☐ Education
15 ☐ Data processing, computer service
16 ☐ Government
17 ☐ Consultant
18 ☐ Wholesale/Distributor
19 ☐ Research/Development
20 ☐ Engineering/Architecture
21 ☐ Other business services
22 ☐ Advertising
23 ☐ Sales/Marketing
24 ☐ Personnel Placement
25 ☐ Entertainment
26 ☐ Other *(please specify)* _____

22 Title *(check one only)*
01 ☐ Chairman/Pres./Owner/Partner
02 ☐ VP—All
03 ☐ Controller/Treasurer
04 ☐ Director
05 ☐ General Manager
06 ☐ Business Manager
07 ☐ Project Manager Chief/Group Leader
08 ☐ Prod./Merch. Manager
09 ☐ Manager/Supervisor not listed above
10 ☐ Data Base Administrator
11 ☐ Other Administrator
12 ☐ Physician
13 ☐ Accountant
14 ☐ Attorney
15 ☐ Consultant/Advisor
16 ☐ Bus. Microcomputer Specialist
17 ☐ Systems Analyst
18 ☐ Writer
19 ☐ Coordinator
20 ☐ Programmer
21 ☐ Engineer
22 ☐ Educator
23 ☐ Representative
24 ☐ Other (please specify) _____

25 Company Size (check one only)
A ☐ Under 10 employees
B ☐ 10-24
C ☐ 25-99
D ☐ 100-249
E ☐ 250-999
F ☐ 1000-2499
G ☐ 2500-4999
H ☐ Over 5000

26 Department (check one only)
01 ☐ Accounting
02 ☐ Administration Management
03 ☐ Communications
04 ☐ Consulting
05 ☐ EDP/MIS
06 ☐ Education/Training
07 ☐ Engineering
08 ☐ Finance
09 ☐ Marketing
10 ☐ Operations
11 ☐ Personnel
12 ☐ Production/Plant
13 ☐ Purchasing
14 ☐ Research & Development
15 ☐ Sales
16 ☐ Other *(please specify)* _____

Does your firm have personal computers?
☐ Yes: If yes, please indicate quantities below. Complete both columns.
☐ No

A: Number currently owned	B: Number plan to purchase within next 12 months	
A _____	B _____	IBM PC/XT Compatible
_____	_____	IBM PC/AT (286) Compatible
_____	_____	Macintosh Classic or SE
_____	_____	Macintosh LC
_____	_____	Macintosh IIcx, IIsi, or IIci
_____	_____	Macintosh IIfx
_____	_____	Macintosh Portable
_____	_____	Amiga 500
A _____	B _____	Amiga 2500 or higher
_____	_____	Atari ST
_____	_____	NeXT Workstation
_____	_____	Sun SPARC system
_____	_____	Other *(Please Specify)*

30 Please estimate your department's budget for computer hardware, software and supplies for the next 12 months:
A ☐ Over $500,000
B ☐ 250,000 to 499,999
C ☐ 100,000 to 249,999
D ☐ 50,000 to 99,999
E ☐ 25,000 to 49,999
F ☐ 10,000 to 24,999
G ☐ Under 10,000

31 Through what channels will your department purchase its hardware software and supplies? *(Check as many as apply)*
A ☐ Computer Retail Store
B ☐ Distributor/Wholesaler
C ☐ Value Added Reseller
D ☐ Consultant
E ☐ Mail Order
F ☐ Manufacturer
G ☐ Other _____

In which of the following ways are you yourself involved with personal computers, accessories and supplies?
☐ Use them
☐ Recommend them
☐ Establish specifications
☐ Approve purchase
☐ Acquire them
☐ Evaluate or select suppliers
☐ Train people to use
☐ Sell them
☐ Develop or manufacture
☐ No involvement
☐ Other involvement *(please specify)* _____

32 For how many personal computers or microcomputer systems do you have this involvement? *(Check one only.)*
A ☐ 1-3
B ☐ 4-9
C ☐ 10-24
D ☐ 25-49
E ☐ 50-99
F ☐ 100 or more

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PLEASE BE SURE TO SIGN YOUR NAME AND INDICATE YOUR TITLE
Have you answered all questions?

MACUPDATE

Lotus Ships 1-2-3 For Macintosh

Lotus Development (Cambridge, Mass.) has announced that it has begun manufacturing and shipping Lotus 1-2-3 for Macintosh, its new 1-2-3 spreadsheet designed for Apple Macintosh personal computers.

Announcing the impending product availability, Jim Manzi, president and CEO of Lotus, said, "With this product, we're opening the door to a whole new market. 1-2-3 users now can share information across the major computing platforms, making it easier to work together."

The Standard edition of 1-2-3 for Macintosh has a suggested retail price of $495 while Network Server and Node editions are $795 and $495 respectively. Lotus said that it is offering a $150 "upgrade" for licensed users of the Macintosh version of Microsoft Excel, Informix Wingz, Ashton-Tate Full Impact and Claris Resolve. Call Lotus at 617/577-8500 for details.

System requirements for 1-2-3 for Macintosh include any Apple Macintosh computer with a hard disk, 2MB of RAM under System 6.0.4 or later, or 3MB of RAM under System 7.0. Lotus 1-2-3 for Macintosh will support Novell NetWare 286, Novell NetWare 386, 3Com 3+ Open, TOPS, AppleShare and DEC Pathworks.

— Barbara E. McMullen & John F. McMullen, Newsbytes

MacPrint Upgrade Supports HP Printers

Insight Development Corporation of Emeryville, Calif. is now shipping version 1.3 of its MacPrint software utility that enables users to connect Macintosh computers to a variety of PCL-compatible printers such as those from Lexmark, Texas Instruments, Okidata and Kyocera. This new upgrade is fully compatible with System 7, according to the company, and supports the full line of Hewlett-Packard LaserJet and DeskJet printers.

MacPrint translates the Macintosh's QuickDraw commands into PCL5, making virtually all low-cost, high-performance PCL-based printers available to the Macintosh user, the company says.

MacPrint 1.3 is list priced at $49 and is available immediately by calling 800/825-4115 or 510/652-4115. Current users of MacPrint can upgrade for $45.

Thought I Could Ships Wallpaper

Thought I Could (New York, N.Y.) is now shipping Wallpaper, a utility for displaying large color patterns on the Macintosh desktop. Wallpaper is a Control Panel device which provides expanded tools for creating and editing color patterns up to 128 pixels on each side — 256 times the area supported by Apple's general Control Panel. Wallpaper includes an infinite "wraparound" graphics editor for creating seamless patterns, a miniature multi-tool painting environment, and an interface that's fun to use, according to the company. Wallpaper automatically records the artists' names on the patterns they create, which may then be freely distributed.

Wallpaper carries a suggested retail price of $39 through January 1992, $59.99 afterward. For more information, call 212/673-9724.

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System Crash Recovery

Casady & Greene (Salinas, Calif.) has announced the release of its new Mac utility program, Crash Barrier, which provides a possible means of recovery in the event of a system "crash" or a "hang."

The utility, which is a Control Panel device installed in the System folder, can also automatically save a user's work to lessen the chance of losing data in an unrecoverable crash.

In the event of a crash or the freezing-up of a Macintosh, Crash Barrier is designed to give the users two options: 1) to recover unsaved work after a crash, and 2) to enable the user to run software which, due to it crashing regularly, could not previously be used.

The utility also offers System Error prevention by warning of such problems as low system memory and memory corruption. Auto-repair features will fix the problem, or once alerted, the user can attempt to fix the problem within the Control Panel, reducing the chances of a crash. The AutoSave feature will save the user's work when Crash Barrier fails to fix an error.

The suggested retail price is $79.95. For more information, call 408/484-9228.

CALENDAR

Meeting times and locations may change at the last minute; call first for confirmation.

We welcome notices of upcoming events for our Calendar. Notices must be received by the second Friday of the month prior to publication. Please mail information to: Calendar, Boston Computer Currents, 4 Chrysler Road, Natick, MA 01760. Or send your notice via MCI Mail to "MZIENTARA." Or fax to 617/593-2682.

Please note: Boston Computer Society (BCS) listings are courtesy of the BCS. BCS events are for members only; non-members are invited to attend one meeting before joining the Society. BCS headquarters are at One Kendall Square, Cambridge, MA 02139. Telephone 617/252-0600.

January 7

BCS OS/2 Group

Live demonstration of 1-2-3 for OS/2 accessing two remote databases, Paradox, and OS/2 Extended Services, using the latest Lotus DataLens drivers. 7 p.m., Lotus' One Rogers Street facility, Cambridge, Mass. Contact Marcia Gulesian at 508/369-3918.

January 8

Ventura Users Group of Greater Boston

Presentations will include "Living and Prospering in the Windows Environment," "On Demand Electronic Publishing," and reviews of Windows utilities: Freedom of Press for Windows, and Winspeed. 6:45 p.m., Wentworth Technical School, 4th Floor of Xerox Building, 191 Spring Street, Lexington, Mass. Call 617/275-3592.

January 9

BCS IBM Group

"Word Processing in Windows." Bill Jones presents Ami Professional. Mike Mikerak presents Microsoft Word for Windows. Karen Acerson presents WordPerfect 5.1 for Windows. Note: special afternoon workshop (3-5 p.m.) by Karen Acerson at $20 for members and $25 for non-members. Meeting at 8 p.m., Aquinas Junior College, 15 Walnut Park, Newton, Mass. Call the IBM office at 617/964-2547.

January 13

Hands-On Novell

"V3.11 System Manager." A three-day (January 13-15) seminar offered by McAuliffe Office Power Computer Center, 50 Cherry Street, Burlington, Vt. On the shores of Lake Champlain. Designed for system managers new to NetWare and NetWare v3.11. Fee: $895. Call 802/658-9889.

Creating Newsletters

A one-day seminar designed to help whether you're a beginner or a seasoned pro. Presented by The Newsletter Factory (Marietta, Ga.), to be held at the Marriott-Copley Place, 110 Huntington Avenue, Boston. Fee: $295. Call 404/955-2002.

Worcester Mac Users Group

"How to Fix Your Mac." Larry Pina, author of *Macintosh II Repair and Upgrade Secrets*, demonstrates. 7 p.m., Worcester Academy's Kingsley Hall. Wheelchair accessible. Call 508/476-7014.

January 14

Pen-Based Computing

GRiD Systems Corp. presents a morning workshop (8:30 a.m. to noon) for those new to pen-based computing. To be held at GRiD Systems Center, One Apple Hill, Rt. 9 East at Loehmann's Village, Natick, Mass. Reservations required. Limited seating. Call 508/651-9904.

BCS Lotus Group

"Lotus on the Mac." The first look at Lotus 1-2-3 for the Macintosh. 7 p.m., Lotus Rogers Auditorium, One Rogers Street, Cambridge, Mass. Call the BCS office for info.

BCS Artificial Intelligence Group

"Stephen Grossberg Speaks Out." Stephen Grossberg, neural network pioneer and director of Boston University's Center for Adaptive Systems, provides a glimpse of future applications for neural networks. 8 p.m., MIT, Building 1, Room 190, 77 Massachusetts Avenue, Cambridge, Mass. Call Carl Fink at 617/261-8514.

Using Microsoft Word the Right Way

A two-session course (January 14 & 21) offered by ComputerImages Corp., 31 Saint James Avenue, Boston. Fee for two sessions: $190. Call 617/350-6161.

January 15

BCS Publishing Group

"Service Bureaus in the '90s." Advanced Computer Graphics talks about the Kodak Prophecy system and progress in typesetting technology. 7 p.m., MIT, Building E51, Room 144, Cambridge, Mass. Contact David Field at 508/356-5159.

January 16

Joint Meeting: BCS Women's Issues Group, Association for Women in Computing, & Data Processing Management Association (Pilgrim Chapter)

"Risks and Responsibilities in End-User Computing." Naomi Karten, author of *Mind Your Business: Strategies for Managing End-User Computing*, will speak about challenges that every organization is facing today. (See story, page 14.) Dinner, 6:30 p.m; presentation, 7:30. Reservations required. Contact Bill Kelly at 508/359-5479.

BCS Consultants & Entrepreneurs

"Building a Successful Consulting Practice." A panel of successful IBM PC consultants discuss how they build and maintain their practices. 7 p.m., 128 Entrepreneurs' Center, 200 Fifth Avenue, Waltham, Mass. Contact Louise Sacco at 617/444-6631.

January 20

Merrimack Valley Users Group

Meets every Tuesday evening at 7 p.m. in the Old Library Professional Building, 190 Hampshire Street, Lawrence, Mass. BBS number is 508/975-7442, 300-2400 baud. Our goal is to serve anyone interested in computers. Sponsored by Computers a la Carte store. Call 508/687-4681 for further information.

January 21

Reports, Proposals, and Memos

A two-day (January 21-22) seminar offered by Information Mapping, Inc., 303 Wyman Street, Waltham, Mass. Designed to help you write clear, effective management communications that eliminate ambiguity and misunderstanding. Call 617/890-7003 for more details.

January 22

BCS General Meeting

"Outlaws and Hackers on the Computer Frontier." Katie Hafner, co-author with husband John Markoff of *Cyberpunk*, talks about computer ethics and computer crimes. 7:30 p.m., New England Life Hall, 225 Clarendon Street, Boston.

January 25

BCS Lap Computer Group

"Managing Data on Your Portable." 11 a.m., The BCS Center, Building 1400, One Kendall Square, Cambridge, Mass. Contact Al Goldman at 617/527-2820.

January 28

BCS Business Group

"Accounting & Finance for Small Business." Bob Traupe highlights lessons learned from subgroup meetings. 7:30 p.m., 128 Entrepreneurs' Center, 200 Fifth Avenue, Waltham, Mass. Contact Traupe at 508/881-6321 for more information.

BCS User Interface Design Group

"Proxima's Cyclops: Presentation Pointer Mouse." The Cyclops is an interactive presentation pointer system that functions as a remote-control mouse. Christine Copley from Proxima demonstrates. 7 p.m., MIT, Building E51, Room 136, Cambridge, Mass. Contact David Owen at 617/893-5151.

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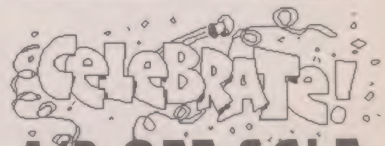

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Advertising Deadline For Next Issue, January 20, 1992 1pm

1 HARDWARE
2 For Sale
3 DTP Hardware
4 Rent/Lease
5 Trade
6 Wanted
7 SOFTWARE
8 For Sale
9 Trade
10 Shareware
11 Wanted
12 MULTI MEDIA
13 ACCESSORIES
14 Cabling
15 Furniture
16 Supplies
17 BUSINESS/FINANCE
18 Business Opportunities
19 Business Plans
20 International
21 Leasing
22 Stock Market
23 COMMERCIAL PROPERTY
24 Office Rental
25 CONSULTANTS
26 Accounting Systems
27 Engineering
28 General
29 Hardware
30 Conversions
31 Lan
32 Programmers
33 Sales/Mktg
34 Software
35 Systems
36 Technical Illustration
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38 Training
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45 SERVICES
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47 Computer Upgrade
48 Disk Conversion
49 Disk Repair
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52 Legal
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54 Public Relations
55 Repair
56 Slides
57 Testing
58 Wanted
59 Word Processing
60 DESKTOP PUBLISHING
61 Design Studios
62 Copy Centers
63 Optical Scanning
64 Plotting
65 Printing
66 Typography
67 Service Bureaus
68 VIDEO/ART

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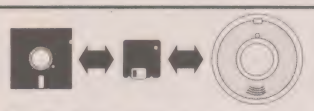

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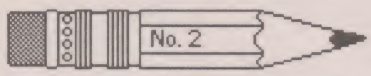

AD DEADLINE JAN.20 1:00pm

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Windows Online — 510/ 736-8343. 9 lines, over 1,300 Windows 3 files. 2.0gigs disk space, USR-DS & Compucom.

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Rate: _____

To have your group or BBS listing in the User Group and Bulletin Board section, we must receive your information and payment a month before publicaton. We do not accept listings for sexually-oriented bulletin boards. We reserve the right to edit listings.

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UPCOMING

Super Word Processing

This in-depth report will cover the latest word processing utilities and techniques. We'll be reviewing a variety of software packages ranging from those for the professional writer to those anyone who uses a word processor can use to improve their correspondence, documents and reports. Thesaurus, dictionary and grammer checking packages head our list which includes Reference Software's Grammatik, the Correct Grammer package from Wordstar's Writing Tools Group, and The Complete Writer's Toolkit from Systems Compatibility Corp.

PLUS: Windows, and Macintosh software reviews, LANs, GiggleBytes and more. Don't miss it.

Advertising Deadline: January 20, 1991
Call Boston Computer Currents: 508/879-0700
to reserve space today!

The Boston Computer Exchange

Mac PowerBook Makes The Scene!

The Macintosh PowerBook model 140 made its first appearance this week on the Big board of the Boston Computer Exchange. The machine was rolled out new at Comdex in October, so it was a fast trip to the secondary market. The first used PowerBook closed at $2,450 versus a street price of about $2,800.

The Mac SE/30 with a 40-megabyte drive lost $100 to close at $1,600. This price decline is due to direct pressure from the Mac Classic II. On an upbeat note, the Mac IIcx 80-megabyte model jumped up $100 to close the week at $2,950. Demand is strong for this popular model and supply is tight on the secondary market.

Toshiba SX Machines Trade Places

The Toshiba 3100SX and 3200SX machines flip-flopped this week, with the T-3100SX machine jumping $100 to close at $2,000 while the T-3200SX machine lost $100 to end out the week at $1,900. This was bound to happen because the T-3100SX is a battery-powered machine whereas the 3200SX is a plug-in model which decreases its value.

The following prices are for the week ending December 13, 1991.

The BoCoEx Index Of Used Computer Prices

Machine	($)Closing	($)Ask	($)Bid
IBM AT 239 20MB	550	650	500
IBM AT 339 30MB	750	1000	700
IBM PS/2 Model 50 20MB	950	1000	800
IBM PS/2 Model 50Z 30MB	1000	1100	850
IBM PS/2 Model 55 60MB	1800	1900	1700
IBM PS/2 Model 55SX 60MB	1450	1500	1400
Compaq Portable III 20MB	750	900	700
Compaq Portable 286 20MB	900	1000	800
Compaq SLT-286 40MB	1200	1300	1000
Compaq LTE-286 20MB	800	1200	700
Compaq LTE-286 40MB	1000	1300	900
Compaq Deskpro 286 40MB	800	1000	700
NEC PowerMate SX+ 40MB	1200	1350	1100
NEC PowerMate SX+ 80MB	1350	1400	1250
Zenith SupersPort-286 20MB	750	900	700
Zenith TurbosPort-386 40MB	1400	1900	1400
Macintosh PowerBook 140 40MB	2450	2500	2300
Macintosh SE 40MB	950	1100	950
Macintosh SE/30 40MB	1600	1750	1500
Macintosh SE/30 80MB	2000	2100	1900
Macintosh II 40MB	2200	2300	2000
Macintosh IIx 80MB	3100	3350	3000
Macintosh IIcx 80MB	3050	3300	2800
Apple ImageWriter II	250	350	200
Apple LaserWriter IINT	1800	2500	1800
HP LaserJet	425	500	400
HP LaserJet II	850	950	800
Toshiba T-1200HB 20MB	750	900	700
Toshiba T-1600 40MB	800	1000	750
Toshiba T-3100 20MB	915	1050	850
Toshiba T-3100SX 40MB	2000	2300	1900
Toshiba T-5100 40MB	1400	1700	1300

BoCoEx Index prices are based on complete systems with keyboard, monochrome monitor and adapter, less the value of any software or peripherals. Call BCE, 617/542-4414; Buyer's Hot Line, 800/262-6399; fax, 617/542-8849. BCE's Fax Yourself Information is 617/542-2345. Ask for extension 300 for BoCoEx Index.

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120MB	1466	1568	1748	1838

486-33MHz w/o CACHE $968

HD	No Monitor	MONO	VGA	SVGA
80MB	$1235	$1348	$1499	$1637
120MB	1377	1477	1626	1738

386-40MHz w/64K CACHE $649

HD	No Monitor	MONO	VGA	SVGA
80MB	$987	$1098	$1237	$1344
120MB	1092	1203	1383	1441

386-33MHz w/64K CACHE $635

HD	No Monitor	MONO	VGA	SVGA
80MB	$947	$1063	$1213	$1325
120MB	1049	1162	1338	1434

386-25MHz w/o CACHE $552

HD	No Monitor	MONO	VGA	SVGA
80MB	$832	$938	$1118	$1179
120MB	928	1018	1188	1249

386SX-20MHz $448

HD	No Monitor	MONO	VGA	SVGA
80MB	$719	$817	$1006	$1056
120MB	818	924	1107	1176

MOTHERBOARD		DRIVES		INTERFACE CARD	
286-16/12MHz w/CPU	$105/95	1.2 TEAC	$57	IDE Controller cd	$25
386SX-20MHz w/CPU	195	1.44 TEAC	57	AT-I/O cd	15
386DX-33MHz w/64K Cache	399	40MB HD	168	VGA cd	55
386DX-40 w/64K cache	415	80MB HD	268	Trident SVGA	88
486DX-25/33 w/64K	655/690	100MB HD	315	Paradise SVGA	76
		120MB HD	365	2400 Modem	66
		200MB HD	525	FAX/Modem	105
		330MB HD	1029		

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DRIVES

TEAC 1.2MB Floppy Drive	$56
TEAC 1.44MB Floppy Drive w/ mounting kit	54
42MB Conner CP3000 28ms	185
120MB Conner CP30104 19ms	335
210MB Conner CP3204 19ms	569
52MB Quantum LPS 52AT 64K Cache 12ms	195
240MB Quantum 240AT 64K Cache 12ms	595
80MB Maxtor 7080A 19ms	275
130MB Maxtor 7120A 15ms	339

MONITORS

Sony 1304 1024x768 Non-Interlaced 0.25mm	575
Seiko CM1450 1024x768 Non-Interlaced 0.25mm	575
Seiko CM1440 1024x768 Interlaced 0.25mm	468
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Viewsonic V4 SVGA 1024x768 0.28mm	308
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ADD-ON CARDS

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Adaptec 1522 BK/1542 BK SCSI Master Adaptor Kit	158/269
ZOLTRIX Fax/Modem (9600/2400bps)	86
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By Lincoln Spector

Friday Comes But Once A Year

When I describe this column to people who know nothing about computers (yes, there still are some), they inevitably respond with "You mean there's something funny about computers?" I've even had one acquaintance hazard to guess at my material: "You mean like, 'Why did the modem cross the road?'"

In truth, finding material has never been a problem: the computer industry is quite generous in that regard. And as 1991 draws to a close, it's time to repay that generosity in the only way I know how: with the Friday Awards, given each year to those people and companies who lived the jokes that it's my duty to report.

For those of you with short memories, the Friday Awards are named after an Ashton-Tate flat-file database program called Friday that barely lasted until the following Monday. Fewer and fewer people remember Friday now, and soon they'll have trouble remembering Ashton-Tate. But to help you remember 1991, the Fifth Annual Friday Awards:

Chip Off the Old Chutzpah Award

Intel takes this one for its 486SX processor, a technical innovation that leaves the original 486 in the dust. After all, anyone could have thought of integrating a math coprocessor into a CPU, but only Intel could have integrated an intentionally crippled coprocessor. If you want a Mercedes, but can't afford one, have your dealer open the hood, cut a couple of cables, then sell you the damaged car at a lower price. Makes sense, doesn't it?

The Boris Karloff Award for the Most Macabre Name For a Software Product

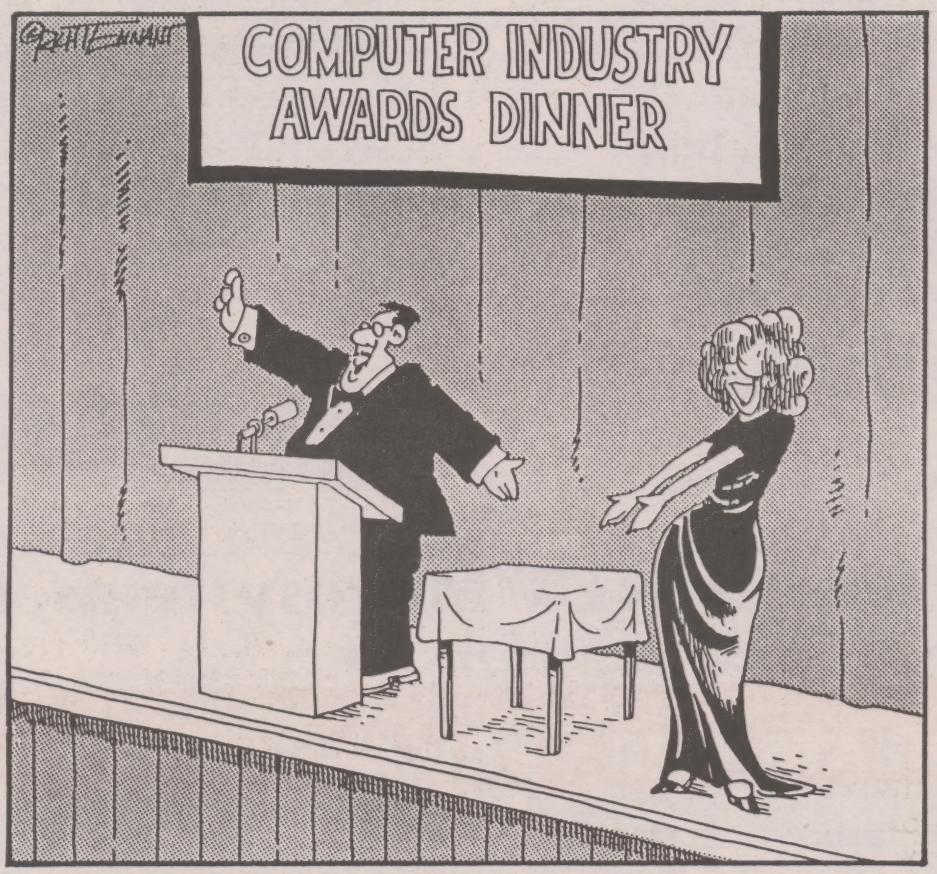
Would you really trust your data to a security program called EZ-CRYPT for Windows? It may be a good program for all I know, but did EZX Publishing have to give it a name that sounds like an early '60s Roger Corman movie?

Best Performance by a Bunch of Scoundrels Taking Last Refuge

One of my jobs at *PC World* is to follow the database market. Last spring, I received endless press releases about the vital role that one data manager after another had played in Operation Desert Storm. They generally opened with something like "U.S Air Force Finds KnoBase Vital For Tracking Which Targets Have Already Been Bombed." I asked other editors if they'd gotten similar notices on their beats. According to our graphics editor, "You should see the clip art."

Most Entertaining Marriage

The only thing more entertaining than the newlyweds at the IBM/Apple nuptials was the horrified reaction of many Apple followers. People who don't watch the PC side of the industry were sure that IBM, as an ally, is a serious threat to the corporate philosophy — or even the existence of John Sculley's laid-back company (frankly, I think Sculley would be more at home at IBM). This is a bit like saying that the (late?) Soviet Union can still control Eastern Europe.



"...AND THE WINNER OF THE VAPORWARE AWARD WILL RECEIVE THIS SIX FOOT GOLD STATUE AND THIS CHECK IN THE AMOUNT OF ONE HUNDRED BILLION DOLLARS."

Most Entertaining Divorce

Let's face it: The above-mentioned marriage never would have happened if IBM and Microsoft hadn't produced their own version of the *War of the Roses*. Actually, considering the evidence of this famed relationship, those Apple followers may have something to worry about, after all. Eleven years ago, IBM jumped in bed with what was really a small, funky startup. Now everyone hates Microsoft.

Silliest Booth at Comdex

Computer Associates' rapping boxers take this one, gloved hands down. In a raised boxing ring, a staged fight competed with four rappers for the audience's attention. Products competed on the floor around the ring, but if anyone was interested in looking at software, they never got through the crowd of dumbstruck curiosity seekers.

The Sight and Sound, Better Late Than Never Citation

I actually heard this at a demonstration of an MPC multimedia workstation: "No, the system hasn't crashed. It's just waiting for the CD-ROM."

The Federal Government Award for the Best Pre-Planned Leak

Can anyone who lived through it ever forget Bill Gates' "worst nightmare" memo? The memo outlined Gates' belief that his company's worst nightmare had been realized, and was under attack by industry rivals and one-time allies, including IBM and Novell. If Borland is technology driven, Lotus marketing driven, and IBM monopoly driven, we now know what drives Microsoft: fear that someone else might be making a buck selling software.

Best Performance by a Leopard Trying to Change its Spots

At one point this past year, IBM was actually considering a name change for OS/2. "I've asked our customers to come up with a better name," IBM president James Cannavino told the *New York Times*. In the end, they decided to stick to OS/2, without even telling us about the names that had been suggested.

Betrayal of the Year

In a Friday first, I'm giving an award to myself. After years of writing nothing but snide comments about graphic interfaces, in 1991 I switched over to Windows — and fell in love. But what brought me around? Was it the innate simplicity of double-clicking on icons? The full-powered professionalism of the applications? The multitasking? Not really. Icons are only useful if you can figure out what they mean, Windows apps require more hard disk space than the Army, and Microsoft's idea of multitasking is scanning the mouse and keyboard at the same time. What brought me into the wonderful world of GUIs were fish-tank screensavers and Bugs Bunny wallpaper.

Most Wanton Destruction of Material

Borland's buying out of Ashton-Tate was, from my point of view, the worst thing to happen in the industry this year. In one fell swoop, Phillippe Kahn wiped out one of the leading sources of computer-related humor. Let us bow our heads in a moment of mourning for the death of the company whose tireless efforts inspired the very name of these awards.

That's it for this year. Once again, I'd like to thank my family, friends, and co-workers for their patience, not to mention all the jokes I stole from them. See you next year.

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Lincoln Spector is the author's real name, appearing on both his driver's license and his birth certificate. An associate editor at ***PC World****, Lincoln Spector can be reached via MCI Mail as "LSPECTOR."*

Gigglebytes is a satirical column loosely based on computer industry events, trends and people. The opinions expressed in this column are the writer's and do not necessarily reflect those of *Computer Currents*.

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Note: *386-33 comes in mid-tower case with 250 watt UL power supply
+486-33 comes in full-tower case with 250 watt UL power sypply.

Free Gift : Each system special comes with both Windows 3.0 and mouse.
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SPECIAL ENDS 2/10/92

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Novell NetWare Lite v. 1.0 w/ DR DOS v.6.0	$89
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Novell NetWare Lite 2-node Starter Kit, Two 8-bit Ethernet Cards, 2 T-connectors, 2 Terminators, 1 Cable	$385

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We're Sorry.

What we really meant was:
QEMM-386 makes the most of every last 'K'—automatically. It finds more RAM between 640K and 1 megabyte than DOS 5 or any other memory manager. Lots more.

We under-sold Optimize.
Optimize does everything we said it does, but it manages your memory much more smoothly and quickly than you'd guess from this ad. It checks out virtually every possible combination of memory mapping—automatically.

We under-stated high memory gain.
QEMM-386 finds even more memory than we said—211K additional high memory in most cases. (We wanted to be conservative, but on most PCs, we got over 200K more room for TSRs and drivers between 640K and one megabyte.)

Oops!
When we said that all other memory managers require you to manually re-allocate memory between expanded and extended types, we should have said most memory managers require manual re-allocation, and none find more useable high memory.

We left out Squeeze.
Some TSRs require a lot more memory to start than they do to run. Squeeze increases available memory to accommodate their memory demand, then cuts it back to just what's necessary. The result? You can get more TSRs and utilities out of the way, and eliminate wasted memory.

Then there's VidRAM.
QEMM-386 can use memory set aside for graphics when you only need text. That's up to an additional 96K without rebooting!

Manifest is included, free.
Award-winning Quarterdeck Manifest is included with both QEMM-386 and QEMM 50/60. It's a $60 value that provides information you simply can't get any other way. And it makes memory simple to understand.

Save time; gain performance.
QEMM lets you use the TSRs you want and still leaves lots of room for network drivers, utilities and memory-hungry programs. You'll get fewer "out of memory" messages and get more work done smoothly and quickly.

Apparently this ad was misleading.

Trying not to over-promise, we were too cautious with our claims.

The truth is, QEMM-386 v.6 is better than we made it sound.

Not only does it typically find a lot more memory than we claimed, it also does its memory management job more quickly, smoothly and unobtrusively than we lead you to believe.

Results of running QEMM-386 v.6 with Stealth*

	DOS 3.3		DOS 4.0		DOS 5.0	
Model	DOS Program Size	Avail High Mem	DOS Program Size	Avail High Mem	DOS Program Size	Avail High Mem
IBM PS/2 80	581K	211K	572K	211K	620K	211K
Compaq 20e	581K	211K	572K	211K	620K	211K
ALR VEISA	582K	211K	573K	211K	620K	211K

This chart shows how big a DOS program can be and how much high memory is made available when you use our new QEMM-386. Sorry it isn't more colorful.

#1
QEMM is the #1 selling utility according to PC Magazine.

Stealth, our new RAM-gain feature, 'maps' ROM into other areas of memory—to provide you with the maximum available RAM between 640K and 1 megabyte. That's space QEMM then uses to load memory-hogging TSRs and drivers (like network software) out of the memory areas your big programs need.

How it works is not as important as the end result—more useable high memory—as much as 211K!

Our Optimize feature works better, too. From its new interface to the way it works with Stealth to calculate memory usage better, for maximum memory gain.

QEMM has won more recognition than all other memory managers combined.

QEMM-386 helps your programs run faster by giving them more memory. And it works great with any DOS from 3.3 to 5. And Windows, too. It's an essential tool for anyone who wants to get the most productivity out of the hardware and software they're using today.

Quarterdeck

* Here we are, being cautious again: Because Stealth alters the memory mapping of your PC, how much high memory you'll gain depends on the 'BIOS' in your computer. We've tested Stealth on a wide range of PCs, from Compaqs to PS/2s; ALRs, Toshibas and many others. Typically, an additional 211K becomes available between 640K and 1 megabyte. Depending on your PC, your memory gain may vary.

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Burlington (617) 272-3344

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